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PROSPECTIVE RATE SETTING INFORMATION SYSTEM DESIGN

VOLUME 2: OPTIONS

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PROSPECTIVE RATE SETTING INFORMATION SYSTEM DESIGN

VOLUME 2: OPTIONS

by

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ABSTRACT

Because health care costs represent an increasingly large proportion of national expenditures, new approaches to cost control and rate setting are receiving much attention. Under a contract with the Social Security Administration, Office of Research and Statistics, MITRE is designing and validating a Prospective Rate Setting Information System (PRSIS). The system is intended to assist rate setting for institutional health care providers such as hospitals and nursing homes. This document, Volume II of the project report, defines the domain of possible system designs, in terms primarily of the possible environments in which the system might be implemented, and the major options available for approaching the system design.

PREFACE

This document is Volume II in a five-volume report being prepared by The MITRE Corporation for the Social Security Administration - Office of Research and Statistics, as part of a project entitled: "Prospective Rate Setting Information System (PRSIS) Design." The work, which is being carried out on SSA Contract Number 600-75-0181, is concerned with Prospective Rate Setting for institutional providers of health care, such as hospitals and nursing homes.

Volume I described the requirements that the PRSIS needs to meet, and also gave background information relevant to the rate setting function and to participating or interfacing organizations.

The present document, Volume II, characterizes the overall domain of possible system designs that need to be explored, and some of the opportunities for innovation in system concepts. It identifies the range of different environments in which the system might be implemented, including the effects of possible Federal initiatives in new cost control and related mechanisms and in National Health Insurance. It also defines some of the major options available to the system designer.

Subsequent documents will cover, in Volume III, the results of discussions and workshops involving knowledgeable people in the field; in Volume IV the results of design exercises and cost-benefit and trade-off analyses; and in Volume V the specific project recommendations for system design and suggestions for system implementation.

As stated in the preface to Volume I, the project members gratefully acknowledge the time spent by senior personnel - representing providers and provider associations, rate setters, third party payors, researchers, and other knowledgeable organizations - and the information and insights that they furnished.

The guidance provided by William L. Damrosch, Project Officer, and by James M. Kaple and Melvin L. Gent, all of SSA, was important in guiding and shaping project work and in reviewing draft documents. Many important insights were also obtained from Katherine G. Bauer of Harvard University - Center for Community Health and Medical Care - which is also an SSA contractor.

At MITRE, in addition to the project personnel listed as authors of this document, Elsie L. Fitt established and structured the project data base of reports, books, and periodicals. A number of MITRE secretaries, including particularly Majorie E. Hayford, typed the several drafts of the document, and the final copy.

Two earlier versions of this document were submitted to SSA in December 1975 and January 1976. Review by SSA-ORS and other agencies of the Department of HEW resulted in a set of comments received by the project in June 1976. This final version of the document takes these comments into account.

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1. INTRODUCTION

1.1 Scope and Purpose of Options Document

This document, which is Volume II in a planned set of five volumes, establishes a family of options or alternatives for the design of the Prospective Rate Setting Information System (PRSIS), which supports and facilitates rate setting for major classes of providers of health care -- namely, hospitals, nursing homes, and related institutions.

A previous document entitled, "Volume I, Requirements," defined the functional and other characteristics that the PRSIS will have to meet. It also identified the organizations that are expected to use or interface with the PRSIS, and their responsibilities, activities, organizational structures, and possible impacts on the rate setting function. Subsequent volumes of the set will document the results of design and review exercises, and cost-benefit and operational analyses for the defined family of system options, and will describe the final project recommendations.

The present document, Volume II, develops a set of several PRSIS concepts that would all meet the previously defined system requirements under various postulated future health care and rate setting environments. In addition, the set of concepts represents a number of different basic approaches to system design.

Chapter 1 reviews briefly the key aspects of the Prospective Rate Setting (PRS) function, the information system (PRSIS) needed to support it, and the expected operational environment. It then outlines the structure and methodology for the subsequent chapters of this document, and highlights insights and findings that have emerged from this phase of the project work.

Chapter 2 then discusses overall system characteristics of the PRSIS, including system topology, and technical alternatives available for implementation. Chapters 3 and 4 discuss the PRS environment and PRSIS options from two different points of view: that of an individual Rate Setting Agency (RSA), and that of the totality of rate setting activities nationwide. Finally, Chapter 5 describes the approach to be used in reviewing and analyzing PRSIS options and subsequently developing recommendations.

1.2 Nature of PRS, the PRSIS, and the Operating Environment

The Prospective Rate Setting (PRS) function here considered is the setting of prices to be charged by institutional providers of health care, and to be paid by some or all purchasers of health care, for any services that will be furnished during a defined future period (often the next provider budget year). This function therefore establishes a tripartite agreement or contract, involving a Rate Setting Agency (RSA), health care providers, and health care purchasers. The latter "agencies" include both individual patients who may pay part or all of their incurred charges, and bulk purchasers or third party payers like Blue Cross and Medicare. At the present time, some 25 to 30 different PRS programs for hospitals are operating in various states or substate areas in the country. Most of these have been established only recently, and many are largely experimental. They operate on the basis of a variety of different types of mandates, scopes of responsibility, and approaches to rate setting. Major objectives of present PRS programs are typically to establish charges based on actual service costs, to insure equity among all payers, to improve provider cost control, and reduce provider costs, while maintaining sufficient provider revenues for financial viability. There are also 15 to 20 different PRS programs for nursing homes, not necessarily using the same PRS organizations or approaches as those for hospitals.

The Prospective Rate Setting Information System (PRSIS) is being designed to provide support to PRS and allied functions nationwide. This means primarily support to RSAs, but also to federal and state agencies that provide policy direction, administrative coordination, and funding to RSAs. The PRSIS will necessarily receive information from, and otherwise interface with, institutional providers and bulk purchasers (third party payors). The former are intended to include not only hospitals and nursing homes, but also health maintenance organizations (HMOs), neighborhood clinics, hospital-affiliated home health agencies, and outpatient physical therapy services -- although most present RSAs deal only with hospitals and/or nursing homes. Present bulk purchasers of institutional health care include Medicare, Medicaid, Maternal and Child Health and Crippled Children program, Blue Cross, commercial insurers, workmen's compensation, and the Comprehensive Health and Medical Program of the Uniformed Services (CHAMPUS). Most presently established RSAs, however, are not authorized to deal with all of these purchasers.

Many other types of organizations may also interface with the PRSIS, including: agencies for review of provider capital expenditures and services, CES planning agencies*, state inspection and licensing agencies, Professional Standards Review Organizations (PSROs), and various trade and professional associations (such as state and national hospital or nursing home associations.)

In the PRSIS design, attention is being given to operation not only in the present rate setting and health care environment, but also in possible future environments, including those influenced (or dominated) by the enactment of some form of National Health Insurance.

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*Planning and CES review are both functions of Health Systems Agencies, newly established under P.L. 93-641.

1.3 Methodology for Remainder of Document

The methodology to be utilized in the subsequent chapters of this document is illustrated in Figure 1-1. As the figure shows, the requirements that were previously established by Volume I are utilized first to discuss general system characteristics in Chapter 2, which leads in turn to definition of options in Chapters 3 and 4.

In Chapter 2 of the present document, the PRSIS is defined in terms of comprehensive lists of potential organizational participants, applications or functions supported, and types of data inputs. Next, two complementary system viewpoints are established for use in subsequent discussions and analyses. The first viewpoint addresses that portion of the PRSIS utilized to support a single RSA, of whatever type and scope of jurisdiction. This permits concentration on the primary role of the PRSIS, reduced to its simplest terms. The second PRSIS viewpoint addresses the complete information system, nationwide, generally including multiple RSAs, interactions among them and between RSAs and other national or state level organizations, public or private. Next, the PRSIS topology, treated as an array of data processing nodes and data communications paths or branches, is discussed from each of the above viewpoints, and certain implementation considerations are reviewed. Finally, available technical alternatives are discussed for each of six principal generic data processing functions (i.e., input, transmission, storage, processing, output, and responding to queries).

In Chapter 3, the RSA viewpoint is pursued in more detail. A set of six scenarios is constructed that characterizes the principal expected environments for a single RSA operation. The scenarios are defined in terms of such variables as the number of bulk purchasers (the

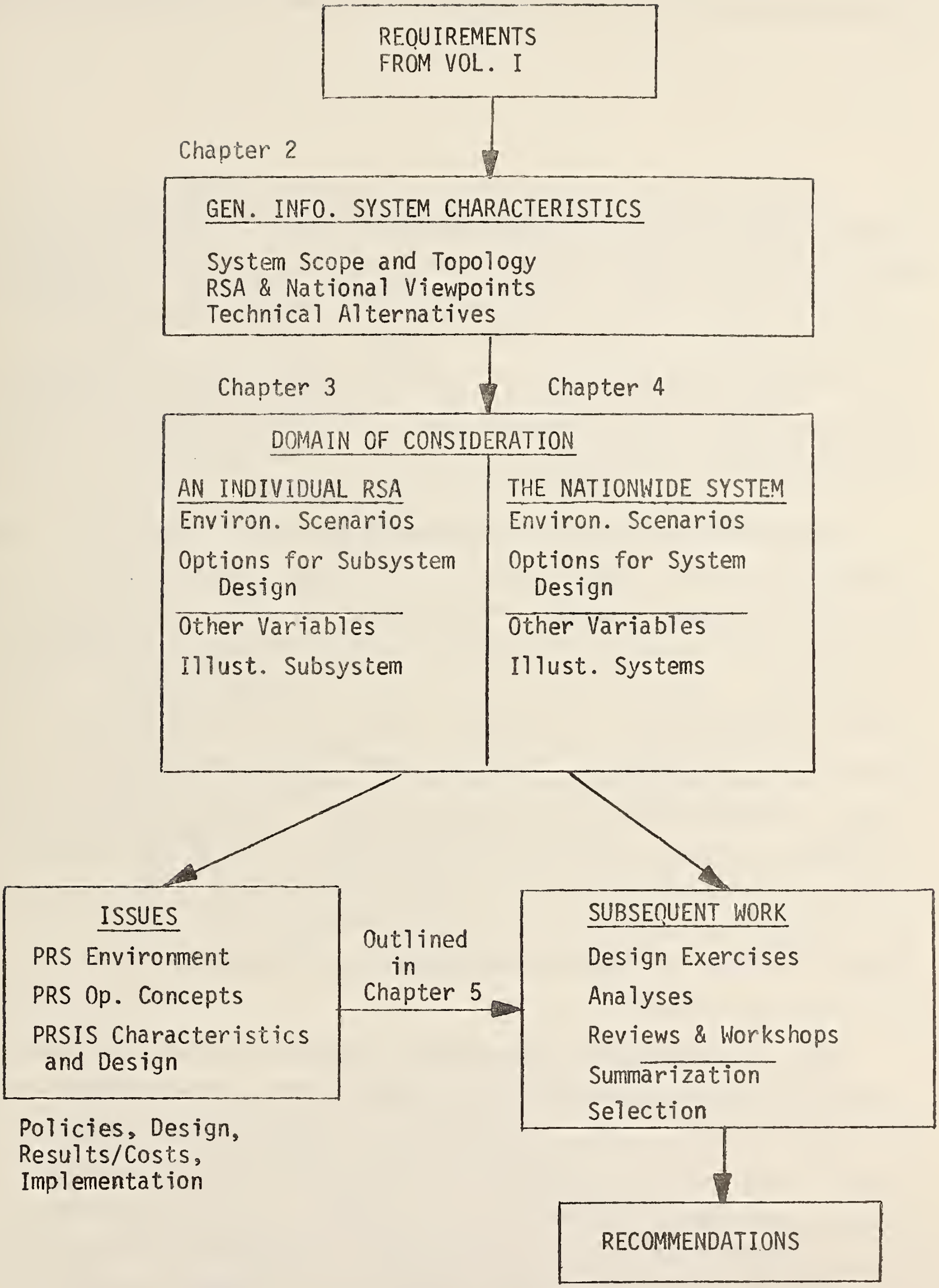

Figure 1-1 Methodology

present number or a reduced number due to enactment of National Health Insurance), whether provider participation in PRS is voluntary or mandatory, the degree of standardization in accounting, reporting and billing, and the level (state, regional, national) at which PRS is performed. The PRS approach is characterized in terms of the basis of payment (e.g., detailed charges), the degree of detail and scope of comparisons used in analyses, and types of allowed adjustments.

The use of environmental scenarios is necessary in order to simplify the complex PRS environment, and reduce some thousands of possible alternatives to a more tractable number. The values that the variables listed above may eventually assume are unknown at this time. Some of the variables are outside the scope of project recommendation, for example, those that will probably be determined by legislation. Other variables may be subject to project recommendations after further analyses have been completed. Although the chosen set of six scenarios does not represent all likely environments, it can be used to exemplify that range of environments for some types of analyses or discussions. The scenarios should be considered, however, as working tools that may later be modified.

Next, a set of four approaches or options for the design of a subsystem supporting an RSA is established. (The word subsystem is used in contrast to the entire PRSIS, a system that is nationwide.) These options are defined in terms of two variables characterizing the overall design approach: whether the subsystem uses dedicated facilities or a service center, and whether PRS alone is supported, or PRS in combination with one or more other functions such as planning. As was the case with the environmental scenarios, the design options are utilized to simplify the overall analysis and discussion.

Finally, Chapter 3 is concluded with a brief discussion of the relationship between the six environmental scenarios and the four design options. Although most of the 24 possible combinations are possible, some are of limited interest.

In Chapter 4, the national system (i.e., the entire PRSIS) is considered from the standpoints of major variables, environmental scenarios, and design options. This treatment, which is analogous to the discussion of the PRS subsystem, utilizes, however, a smaller number of variables. The scenario-defining variables are: whether PRS is a state or federal responsibility, and whether it is carried out directly or delegated; how many RSAs are incorporated in the system; whether the PRS method can vary by RSA jurisdiction, and, if not, what PRS approach is used.

Only two design options are defined for the national system. In one the system is, in effect, an assembly or aggregation of semi-autonomous RSA subsystems. In the other option, the entire nationwide system is designed as an integrated whole, and each RSA is served by a partition or element of that whole.

Chapter 4 concludes with a brief look at nationwide scenario-option interactions.

Chapters 2, 3 and 4 together present the main substance of this options document, which is intended principally to furnish a framework for subsequent design, analysis and evaluation. The general nature of this subsequent work is characterized briefly in Chapter 5. The content of this chapter is illustrated in the bottom portion of Figure 1-1. First, a selected set of major issues confronting the PRSIS designer is presented. The issues are classified both by area of impact (PRS environment, PRS operational concepts, PRSIS characteristics and technology), and by "field" (policy, design, results relative to costs, implementation). Second, criteria are defined that will be employed to compare alternatives and make the evaluations and selections necessary to develop recommendations. Criteria are established in each of the "fields" listed above. Third, the design exercises, analyses, and reviews and workshops that will be conducted are briefly described.

1.4 Observations and Findings to Date

The work previously reported in Volume I, and that being discussed in the present document, Volume II, are concerned primarily with setting up the framework, and reviewing the background information, that will be utilized in subsequent project work. Nevertheless, a number of preliminary conclusions have already emerged. These, which may properly be called observations and findings, have been developed as by-products of the system viewpoint taken by the project. Some that may be of general interest are summarized below.

Policy

1. Achieving equity among payors depends upon the basis of payment as well as on rate setting. Specifically, equity has two faces:
   - equity concerning resources used for each case -- obtained through detailed charges by service component.
   - equity concerning the intended health care product -- obtained through a total case charge by diagnosis.

2. The imposition of standardization and an integrated PRSIS would require some incentives in the form of federal funding. The extent of this will depend upon the amount of modification required in current practice.

Design

1. The designer must consider both RSA and national viewpoints for a national PRSIS system. Consideration of the RSA alone could lead to suboptimization from the national viewpoint due to possible conflicts in goals or needs between the individual RSA (e.g., state) and national objectives and programs.

2. The preferred PRS/PRSIS will vary somewhat from state to state (if carried out at that level) depending in part on existing conditions in health care regulation. Also, state-level RSAs would vary in total workload by a factor of about 100:1; this may imply large differences in types of automation appropriate for individual RSAs -- unless federal (nationwide) approaches and standards dominate.

3. A highly federalized and centralized PRS would probably require a highly automated PRSIS, sophisticated peer group structures, economic projections, and screening criteria; despite this, "local" level contacts with providers would still be essential to handle exceptions, appeals, etc.

4. With or without centralized PRS, federal coordination and monitoring would be complicated by inherent differences between provider groupings established at the state level and such groupings at the national level, and among differing groupings for different states.

5. Certain technology-related possibilities appear worth further consideration. These include:
    - widespread application of computers by all classes of providers due to low cost, but capable, micro-computers and provider-oriented service bureaus.
    - machine-to-machine interaction between the more mechanized providers and the RSA, including perhaps unofficial *trial* rate submissions directly to the RSA computer.

Cost

1. The PRSIS is a support system, and as such has no *direct* role in reducing health care costs and charges. Therefore, one must first address the benefits versus costs for PRS before determining what level of expenditures for the PRSIS would be reasonable. A useful framework for thinking about PRS costs (benefits remain to be ascertained) is:

• Institutional Health Care		$50 B/yr (100%)
• Total Administration	approx.	10 B/yr (20%)
• Total Regulation	approx.	1 B/yr (2%)
• Total PRS (if nationwide)	approx.	50 M/yr (0.1%)

2. The benefits of PRS and to some extent its costs are dependent upon the character of other planning and regulatory activities in the health care field.

3. Integrated nationwide PRSIS design should best minimize total system operating cost (or life cycle cost), at least if set up "from scratch." But the likely existence of a large number of PRS systems already in operation at the time of national implementation would make introduction of a new system quite costly.

Implementation

1. The PRS program for any RSA jurisdiction will be characterized by a sequence of identifiable phases, from pilot and start-up, through early operation, to perhaps a maintenance phase, interrupted by periods of change or perturbation (caused, for example, by advances in medical technology, institution of new national health programs or economic cycles). PRS characteristics (and therefore information system objectives) may vary widely between phases.

2. Since the art and technology of PRS is still evolving, any PRSIS implementation must allow for future modifications and additions to the PRS approach.

2. GENERAL INFORMATION SYSTEM CHARACTERISTICS

The overall characteristics of the Prospective Rate Setting Information System (PRSIS) are discussed in this chapter, in preparation for the identification of system alternatives in Chapters 3 and 4. After a review of the scope of the system, including its principal functions or applications, two different, but complementary, approaches to visualizing the system are introduced. Next, certain topological and related aspects of the PRSIS are presented, and the major technical choices facing the system designer are outlined.

2.1 System Scope

Although the scope of the PRSIS has already been delineated in Volume I, a brief recapitulation of this information is necessary to the present discussion. The overall character of the system is largely determined by its domain in terms of three elements: participants, applications and data utilized.

In regard to participants, the primary focus of the PRSIS is support to the Rate Setting Agencies or Authorities (RSAs) that deal with institutional providers of health care. The PRSIS may also support other organizations that exchange data with RSAs or otherwise interface with them. This includes providers, bulk purchasers of health care, health planning agencies, and other regulatory and review organizations. The overall scope of potential participants is shown in Table 2-I.

The range of PRSIS applications, or functions that the PRSIS supports, is indicated in Table 2-II. Here the potential applications

TABLE 2-I

LIST OF POTENTIAL PRSIS PARTICIPANTS

A. RATE SETTING AGENCIES

B. Other Governmental Agencies, Commissions and Affiliates

Planning Agencies*
Capital Expenditures and Service (CES) Review Agencies*
Professional Standards Review Organizations (PSROs)
Federal & State Health Departments, and advisory councils and commissions
Other governmental bodies

C. Providers

1. Institutional Providers

Hospitals: General medical and surgical; Specialty (psychiatric, tuberculosis, general chronic, other)
Nursing Homes: Nursing care homes, personal care homes with nursing, personal care homes without nursing, domiciliary care homes

Health Maintenance Organizations and Other Facilities

2. Associations of Providers - area, state, national

Hospital Consortia (area), Hospital Associations (state and national),
American Nursing Home Association (ANHA), Medical Associations
Agencies or Boards for certification, accreditation or approv

D. Bulk Purchasers of Service/Third Party Payors

Public Assistance Programs: Title V (Maternal and Child Health), Title XIX (Medicaid)

Insurance: Title XVIII (Medicare), Blue Cross, Blue Shield, Commercial Insurers, Health Maintenance Organizations (HMOs), Civilian Health and Medical Program of the Uniformed Services (CHAMPUS)

E. Intermediaries

Intermediaries assisting in the administration of government programs
Employers performing various intermediary roles

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*Planning and CES review are functions of Health Systems Agencies, newly established under P.L. 93-641.

TABLE 2-II

APPLICATIONS OR FUNCTIONS SUPPORTED

Primary Applications

- Prospective Rate Setting for institutional providers and bulk and other purchasers of health care; monitoring provider service activities, charges and finances.*
- Promulgating relevant federal and state policies, standards and guidelines, and monitoring compliance.
- The coordination of PRS with state and area health planning, and with other health care regulatory functions.
- Analysis, research, evaluation and experimentation by governmental or private bodies, to the extent that PRSIS data can be released for these purposes.

Secondary or Optional Applications

- Selected aspects, as appropriate, of non-PRS regulatory and planning activities, such as capital expenditures and services review and health care planning.
- Reimbursing providers for service rendered.
- Advancing funds to agents or intermediaries to enable them to reimburse providers.
- Checking the eligibility of consumers seeking care.

---

* Information system should support both the initial development phase of a PRS program, and also the subsequent operational phase or phases. It may also assist a program in constructively evaluating its effectiveness.

are separated into a primary set that is considered mandatory for the system concept, and a secondary set that is viewed as optional.

The support that the PRSIS can provide to the PRS function per se is itself complex. It involves the screening and analysis of rate submissions by providers, and keeping track of, or monitoring, provider service statistics, charges that are made for these services, and overall provider expenses, income, and cash flow and balance sheet accounts. It may also be concerned with identifying the need for subsequent rate adjustment, and what magnitudes of adjustment are appropriate. Normally, the PRSIS will support not only PRS operations, but also the development, installation and test of the initial PRS structure and any available baseline data. Finally, it may provide support to the RSA for a number of subsidiary functions such as research, evaluation,* modelling or gaming and activities associated with the editing, updating and publishing of policies and procedural handbooks.

In order to provide support to PRS and related activities, the PRSIS will need to deal with the several types of input data that are listed in Table 2-III. As in the list of applications given previously in Table 2-II, the list of input data types is divided into a mandatory section and an optional one. The input data categories most central to the rate setting function are of course the provider reports and rate submissions.

---

*The type of evaluation most useful to the RSA itself is "constructive evaluation" that would suggest how the rate setting activity could become more effective.

TABLE 2-III

SCOPE OF PRSIS DATA INPUTS

CORE DATA

Provider Reports[1]

Operating Budget:

(Statistics, Budgeted Expenses, Cost Allocation and Proposed Rates, Budgeted Revenues)

Capital Expenditures Budget; Cash Flow Budget; Reports on actuals vs. budget

Provider Rate Submissions

Semi-Fixed Provider Descriptors

Identification, Classification, Capacity

Bulk Purchaser Data

Enrollment, Financial Reports

Federal & State Standards, Guidelines, Policies, Legislation, etc.

Titles V, XVIII, VIX, P. L. 93-641, Standards

Data From Other Regulatory and Planning Agencies

CES[2], Planning, Inspection and Licensing, PSROs

Socio-Economic Forecast Data

Demography, Health Trends, Demand for Health Care, Economic Indices

OPTIONAL DATA

Billing by Providers

To Patients or Bulk Purchasers

Patient Discharge Abstracts

Identification, Administrative and Clinical Data

Purchaser Enrollee Status and Eligibility Data

Scope and Duration of Coverage, Benefit Structure, Coinsurance and Deductibles, Financial Status

Reimbursement Data

Reimbursement to Providers and Intermediaries

Data Support to Other Regulatory and Planning Agencies

Utilization Statistics (for planning and CES[2])
Semi-Fixed Provider Data (for inspection & licensing)

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[1] Hospitals, Nursing Homes and Other Institutions

[2] CES: Capital Expenditure & Services review

2.2 Major Information Subsystems and System Viewpoints

As is clear from the preceding discussion, the nationwide characterization of both the Prospective Rate Setting (PRS) function and its supporting information system (PRSIS) are rather complex. Both involve activities of a large number of different participating or interfacing agencies, arranged in a hierarchy of "levels" extending from the individual providers that carry out the substantive work of health care, up through intermediate levels (service areas, states and multistate regions) performing administration, planning and other functions, to the national level. The function of PRS is composed of a number of different elements or activities, and may be carried out in a variety of ways. The character of PRS will also be greatly influenced by the applicable aspects of the constantly changing health care environment, including the possible enactment of some form of National Health Insurance. The PRSIS, in turn, is subject to all the possible variations in the PRS function that it supports, but depends also upon technical factors and other variables of its own.

In order better to structure the PRS and PRSIS alternatives that need to be considered, we shall adopt two different but complementary points of view. These may be called the Rate Setting Agency (RSA) point of view, and the National point of view.

2.2.1 The RSA Viewpoint

In this viewpoint, only the functions carried out by an individual rate setting authority are considered, together with the information support that these functions require. The individual authority, or RSA, is that organization responsible for establishing prices to be charged by providers, and paid by individual patients and by bulk purchasers of health care or third party payors. Normally, the RSA will review provider rate submissions and purchaser and other data, make rate determinations, and follow through in any necessary subsequent activities such as monitoring provider performance, conducting hearings and handling relevant litigation. It is also usually concerned with setting up the initial procedures and analytical framework for rate setting, and with interfacing with health planning and other agencies having functions related to rate setting.

Depending upon what overall national policies and health care funding mechanisms may be established, and also upon possible federal legislation specifically directed toward prospective rate setting, the RSA may be a governmental agency, a quasi-governmental commission, or a private contractor or intermediary. Although typically rate setting is carried out at the state level, the very populous states (e.g., California, New York) may be divided into multiple jurisdictions. Also, for some potential future types of national policies and programs (including particularly some forms of National Health Insurance), rate setting might be performed at a multi-state regional level or even at the national level. It is clear, therefore, that a Rate Setting Authority could have within its jurisdiction as few as 14 hospitals and 34 nursing homes (Delaware) or 28 hospitals and 8 nursing homes (Alaska), or as many as 7500 hospitals and 22,000 nursing homes (total U.S.). But many aspects of rate setting are largely independent of exactly where the function is performed, and by whom.

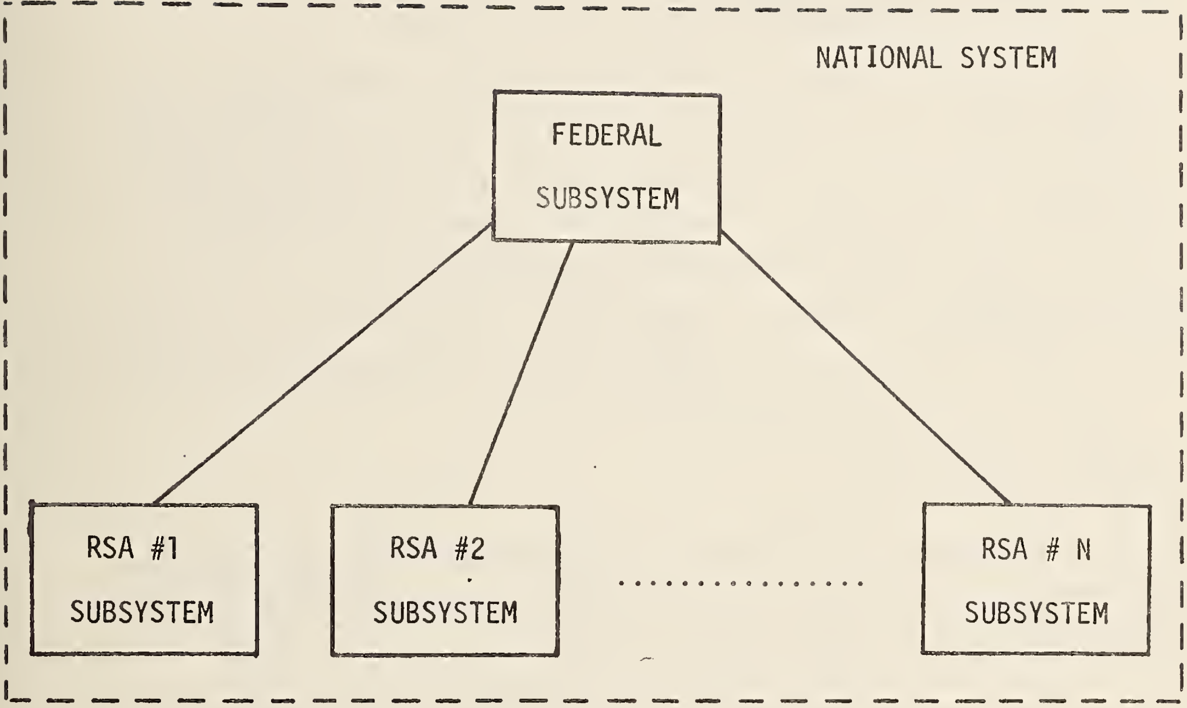
From the RSA viewpoint, the direct rate setting functions and their supporting information subsystem (called a subsystem to distinguish it from the national system), can be studied in detail without the distracting complexities presented by multiple RSAs, and Federal/state interactions.

2.2.2 The National Viewpoint

As its name suggests, this viewpoint encompasses the nationwide rate setting functions and their related information system. The scope of these functions includes not only the direct activities of all the individual RSAs, but also inter-RSA activities, as well as coordinating and integrating activities at the national level. Consequently, this viewpoint considers the individual RSAs -- their functions and information subsystems -- as either building blocks from which the national system can be assembled, or partitions into which that system can be divided.

The relation between the RSA and national viewpoints is basically a very simple one, as illustrated in Figure 2-1. In interpreting this figure, however, the reader must keep in mind the many possible RSA variations -- that is, the spectrum of different RSAs that may be incorporated into one type of national system, as well as the many possible different national structures that could be adopted.

The presence of a "federal subsystem" as one component of the "national system" may seem confusing. This nomenclature is used to distinguish between those relevant functions performed at the federal level in, for example, agencies within the Department of HEW, and the nationwide totality of all rate-setting and related functions performed by all levels of government and in the private sector.



Note: RSAs will typically be at the state level; but with some national scenarios, may be at a multi-state regional level or even at the national level.

Figure 2-1

Major Subsystems in PRSIS

2.3 System Topology and Overall Characteristics

From the discussions presented in the two preceding sections, it is evident that the PRSIS is a data processing system composed of elements that are geographically distributed over many different locations. The system is composed of a large number of nodes, at which several kinds of data processing functions are carried out, and communication paths or branches that connect the nodes together. This type of system topology leads in turn to some special properties regarding system implementation.

2.3.1 System Topology

In accordance with the two complementary system viewpoints introduced in Section 2.2, the topology will be discussed separately for the RSA subsystem, and the national system.

The topological structure of the RSA subsystem is illustrated by the network shown in Figure 2-2. The principal elements of this subsystem are the single RSA node, the many institutional provider nodes, and the branches connecting the former to each of the latter. As explained in Section 2.2, the geographical scope of an RSA, while typically one state, could also be a section of a large state, or with some types of nationwide health care administration, a multi-state region or the entire country. Depending upon the geographical jurisdiction, and the types of institutional providers covered -- just hospitals, or hospitals plus some or all categories of nursing homes -- the number of provider nodes may vary from as few as 10 or 20 for a state jurisdiction of small geographical size and/or low population, to as many as 10 to 30 thousand for a national jurisdiction.

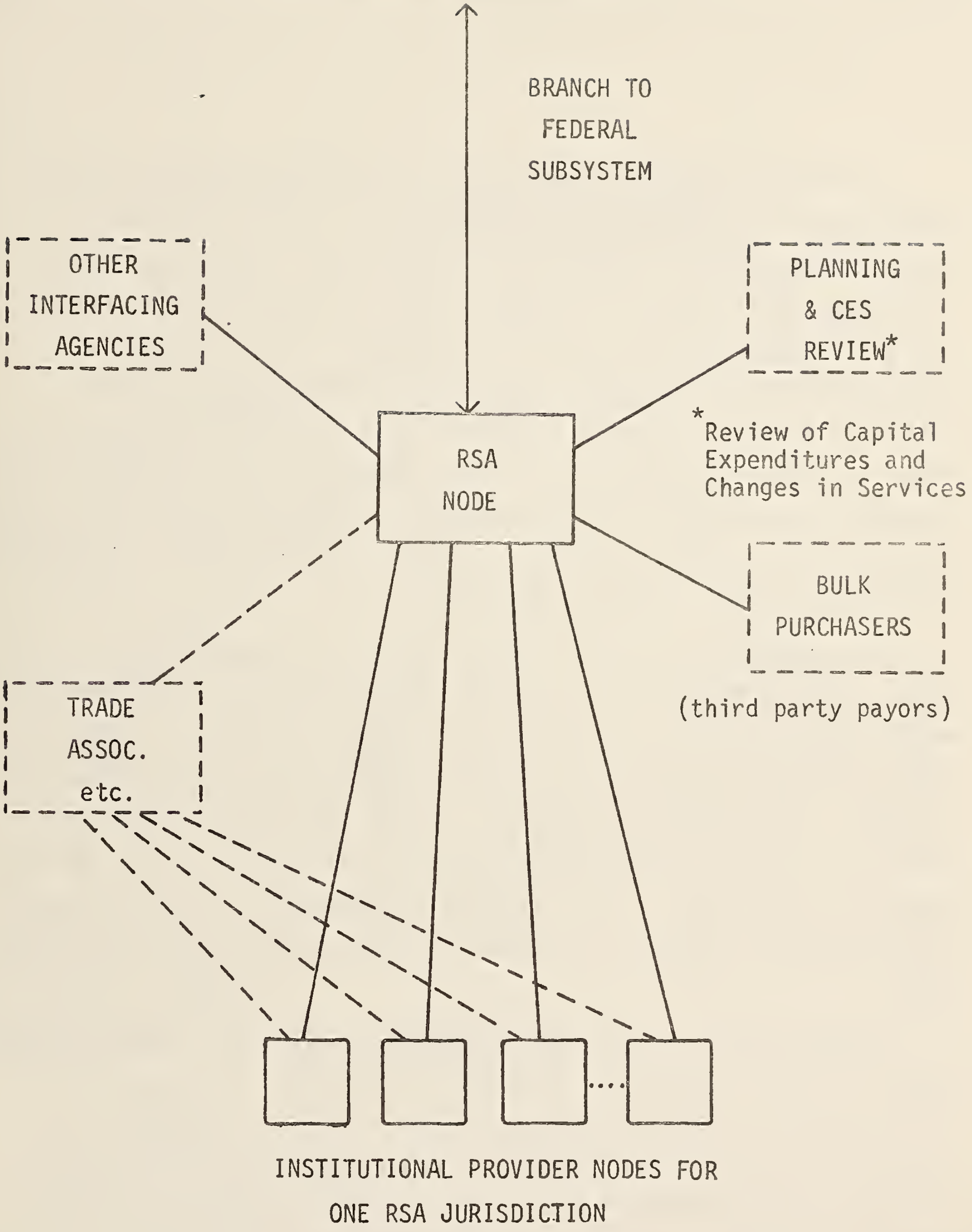

BRANCH TO FEDERAL SUBSYSTEM
OTHER INTERFACING AGENCIES
PLANNING & CES REVIEW*
RSA NODE
*Review of Capital Expenditures and Changes in Services
BULK PURCHASERS
(third party payors)
TRADE ASSOC. etc.
INSTITUTIONAL PROVIDER NODES FOR ONE RSA JURISDICTION

Figure 2-2

RSA Subsystem Topology

As further shown in Figure 2-2, the RSA subsystem also contains branches connecting the RSA node to the federal subsystem, and to other interfacing agencies, such as those performing health care planning or review of provider capital expenditures and changes in services or bulk purchasing of health care. The subsystem may also provide direct support to some of the interfacing agencies. Finally, other nodes such as provider trade associations (e.g., state or national hospital or nursing home associations) may be present in the system, with corresponding communication branches. Such associations may represent providers in various ways, including acting for them in rate negotiations.

In the simplest case, namely a network not containing the nodes and branches depicted by dashed lines in Figure 2-2, the provider nodes furnish directly to the RSA rate setting submissions, associated reports and other inputs, and receive directly rate decision documents and other appropriate RSA outputs. The RSA performs all data processing associated with the several rate setting steps and functions, and exchanges certain kinds of data with other agencies. In other cases, the allocation of functions among nodes and branches may be more complex.

By contrast with an RSA subsystem, the national system is both larger and more complex, as suggested by Figure 2-3. Composed of a set of several or many RSA subsystems and a federal subsystem, together perhaps with other elements, the national system necessarily contains a large number of nodes and branches, organized into hierarchical groupings, and with many different types of interconnections.

The number of RSA subsystems would be about 50 if rate setting is performed at the state level, but could be 60 or 70 if the more populous states are subdivided. If RSAs were instead associated with the standard multi-state federal regions, then there would be 10. In

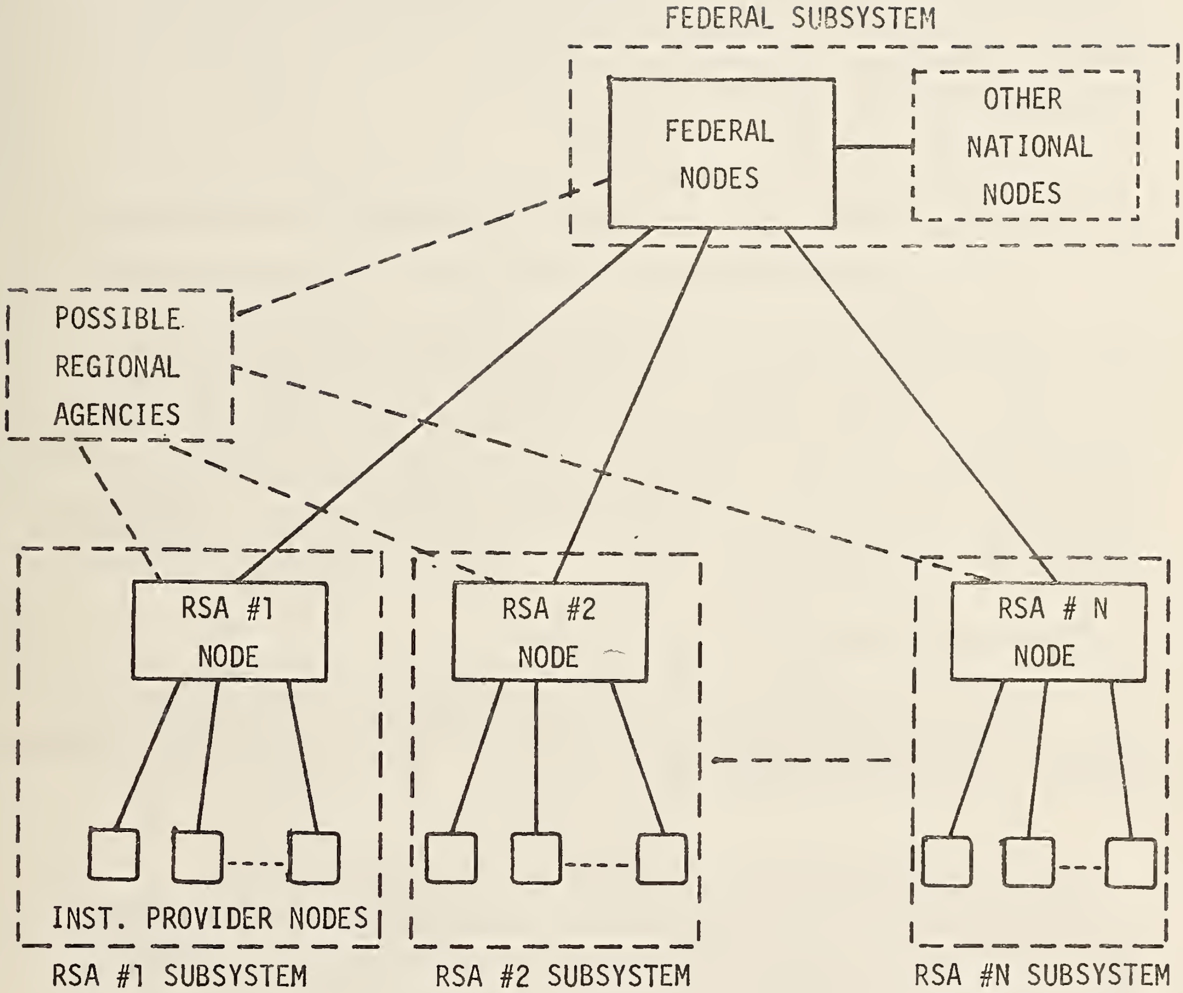


Figure 2-3

National System Topology

the perhaps unlikely case that PRS is performed at the national level, the national system would be composed of only one PRS subsystem, and perhaps a few other elements -- this situation obviously would have to be treated as a special case.

In the national system, rate setting operations and their associated information support, would normally be performed in each RSA subsystem at the RSA node. Federal functions of promulgating policies, monitoring and evaluating operations, and statistical analyses and research, would normally be performed in the federal subsystem. Various other ways of partitioning the PRSIS functions would also be possible, however, including multi-node sharing. Bulk purchasers and national provider trade associations(e.g., Blue Cross Plans, Am. Hospital Assn.) could also take considerable PRSIS roles.

2.3.2 Overall System Characteristics

As a result of the scope of the PRSIS, and its topology that was just discussed, the system has certain overall properties important to its design and implementation.

Looking at the fine structure of the PRSIS, one sees a large number of nodes, with widely varying requirements for data processing functions, and for workloads that have to be handled. Similarly, the volumes, types and scheduling of communications in the many network branches also vary greatly. In view of this diversity in functional requirements, one would expect that many different technical approaches would be appropriate -- the choice of data handling technology at each node and branch depending upon the individual requirements for that system element. Looking at the entire PRSIS, however, one sees a large requirement for exchange of data between nodes, both "vertically" and "horizontally," in the network pictured in Figure 2-3. In particular, the nodes in the federal subsystem must receive data from all RSA subsystems, as well as from many other sources, at both state and national levels, in order to carry out their functions of planning, review, monitoring, evaluation and research. For such data exchange to be successful, some degree of compatibility, standardization and systemwide integration is clearly required. Thus, in designing the PRSIS, numerous trade-offs will have to be made between the individual requirements of the various nodes and branches, and the systemwide requirements for data exchange.

The choice of what data processing technology to use for each PRSIS application or function is a key design decision that must be made for every node and branch in the system. For some portions of the domain of applications and functions vs. nodes and branches, "manual" techniques will be appropriate because of low work volume, little repetition, and much need for human judgement. "Manual" techniques are meant to cover staff personnel utilizing at most low cost individual devices like typewriters, hand or desk calculators, and "ordinary" documents and files. Such devices, no matter how capable individually, are not able to perform interdevice communication, or to read files automatically.

For other portions of the domain, some degree of digital automation may be desirable. In this case, staff personnel are aided by computers that can store and use extensive programs and large files of data. Such computers, of course, cover a wide spectrum of capacities, speeds, and problem handling capabilities, and vary in price by nearly a factor of 1000. An automated PRSIS node can utilize a computer dedicated only to functions of that node, or one shared with other agencies or functions, including a computerized service center operated by a governmental agency, a bulk purchaser or trade association, a university, or a commercial concern. Another key variable is the mode of operation of the computer: batch, on-line, or a combination of both.

The choices of manual vs. automated operation, and if automated, of dedicated vs. shared (including a service center), and of mode of operation, are largely economic questions, with some performance or functional overtones. The major PRSIS implementation tasks and thus cost components are listed in Table 2-IV under the headings of development and installation, and operation and maintenance. In an actual PRSIS program, these tasks and cost components would be applicable to each subsystem or other major element, and to each stage of a multi-stage or phased implementation.

In designing and implementing a new information system (or subsystem) to support rate setting, one should first determine what is already available and can be utilized to meet some or all of the functional requirements. There are a large number of specialized data handling services (known by such acronyms as PAS, HAS, CHIPS) that can be used by providers or by rate setters to process budgetary, accounting, billing, or clinical data. In addition, a rate setting agency may be able to locate unused computational capacity in federal or state data centers, or in data centers operated by bulk purchasers (e.g., Blue Cross Plans) or state or national hospital associations. Commercial service bureaus should also be considered. All of these service organizations may have equipment and software that are applicable to the RSA requirements.

In addition to investigating possibilities for service support, one also should investigate available software (i.e., applications programs). The considerable number of RSAs that are already using automated techniques constitute a source of operationally proven procedures and software that may be useful either as it stands, or with some modification. It should be noted, however, that such modification is easy only if the original program is written in a suitable language and is well documented. Questions of compatibility of acquired programs with equipment and systems software available to the RSA are also important.

A few key points should be emphasized in summary. At low workloads the manual approach can be functionally satisfactory and cost effective, unless constraints favoring automation are imposed by the rest of the PRSIS. Using a service center or sharing a system with other users can make even relatively low volume computer operations cost effective. With low cost but flexible microcomputers available, dedicated computers can also be used economically at relatively low workloads. Development and installation costs can be greatly reduced by adopting (if applicable) designs, procedures and software that are already in successful operation elsewhere.

2.4 Scope of Technical Alternatives

The basic data processing functions carried out in an information system, whether manual or partially or "fully" automated, may be classified as follows:

1. Data Input and (as required) Conversion
2. Data Transmission
3. File Storage and Data Management
4. Data Processing
5. Output Document or Report Preparation
6. Providing Responses to Queries

TABLE 2-IV

PRSIS IMPLEMENTATION TASKS AND COST COMPONENTS

(Once requirements have been established)

A. DEVELOPMENT AND INSTALLATION

1. Design System.
2. Determine what available equipment, software, and services could be utilized.
3. Select and acquire equipment(1) and/or select and contract with service center.
4. Acquire systems software and acquire or develop and document applications programs(2).
5. Develop procedures, select and train personnel.
6. Install acquired equipment and software(1), implement data input processes, conduct test and pilot operation, evaluate results.
7. Correct any problems and convert to full operation.

B. OPERATION AND MAINTENANCE

1. Conduct productive operation.
2. Audit and monitor input and output quality.
3. Maintain acquired equipment.
4. Maintain and upgrade as necessary all procedures, and software(2).
5. Upgrade staff training, acquire and train new staff if required.

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(1) Note that equipment can be purchased or leased.

(2) Applicable to computerized portion of system only.

The types of technology available for handling each of these specific functions is indicated in the discussion below. Back-up information is presented in Appendix A.

2.4.1 Data Input and Conversion

The dominant problem in the design and operation of many, and perhaps most, information systems is how to obtain high quality, timely and complete data inputs. Solving this problem is largely a matter of standardized procedures, data elements and data forms, personnel training and supervision and suitable reviews, checks and audits. In many cases, it requires some modification of the substantive operation (e.g., a routine or special clinical service) that generates the data. In the PRSIS, the input problem is greatly complicated by the large number of sources of data (chiefly the institutional providers) and their diversity.

For portions of the PRSIS that are computerized, there is the added problem of obtaining data in machine-readable form. Some providers may be able and willing to furnish budget and accounting reports on magnetic tape or other digital media. (Many of the planning and regulatory agencies may also furnish data in this form.) Some providers who do not use computerized techniques may be willing to submit reports in a type font and format suitable for Optical Character Recognition (OCR). However, it should be recognized that OCR imposes some limitations on the report preparation process, and that the design of OCR forms for the rate submission reports can appear somewhat awkward. Furthermore, many or most provider submissions are currently not typed but are handwritten. Thus while OCR may be an important future consideration, its value for near-term implementation appears limited.

If the data are not submitted in machine-readable form, they must be converted to this form for use in the computerized portions of the PRSIS. This requires manual entry of the data into a keyboard device, and usually subsequent checking or verification of the entered material. There is a variety of keyboard entry devices available, including units with a page printer and/or a Cathode Ray Tube (CRT) display for feedback to the operator and other purposes. The output from the device can record on punched cards, magnetic tape or a magnetic disc, or can be processed directly by a computer connected on-line to the keyboard unit. With the on-line connection, and a printer or CRT, the computer can assist the keyboard operator by presenting formats and performing various kinds of checks. Regardless of what particular keyboard entry is utilized, however, the entry process is time-consuming and expensive -- often the dominant cost element in the data processing system. It is also very error prone, and so requires suitable controls and checking.

2.4.2 Data Transmission

Almost by definition, nearly every type of PRSIS input data, as listed in Table 2-III, generated at a source location, must be transmitted to another location for processing. Thus, for example, provider inputs, which constitute the bulk of such data, must be transmitted to RSAs, other planning or regulatory agencies, and bulk purchasers. Many other categories of input data, as well as much of the PRSIS data outputs, must also be transmitted.

Documents and reports in hard copy form can be sent by mail or by messenger. (Facsimile methods do not appear applicable here.) These methods are also useful for sending machine-readable media such as cards, tapes or some kinds of discs. More rapid but also more expensive service can be provided through digital data transmission via the dial-up (switched) telecommunications network, or via leased lines.* This provides communication, however, only between digital devices such as central computer units, or terminals or other peripherals.

Most provider submissions will probably be sent by mail or messenger, even if in magnetic tape form. Data to be sent between RSAs and other regulatory or planning agencies, bulk purchasers, hospital associations, or federal agencies, may frequently be available in digital form, and so be suitable for dial-up or leased line transmission. The choices between these two methods, and between digital data transmission and mail or messenger, depend on tariff rates, and on such performance factors as: how soon the recipient needs the data, how much data must be sent, and on what schedule. It appears that most interagency data exchanges in the PRSIS do not involve steady transmission workloads throughout a week, month or year, but rather are of pulsed character. Exceptions to the pulsed characteristic would occur for billing and discharge abstract data if these are part of the PRSIS.

2.4.3 File Storage and Data Management

Provider rate submissions, budgets, and accounting reports represent the principal part of the data used directly in rate setting, and will be retained in RSA files, typically for several years. Billing and reimbursement data, and discharge abstract data, will also require filing and retention for the same or longer periods.

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*It is worth noting that SSA has found through study that this approach is not cost effective for intermediary transmission of Medicare billing data to Baltimore and has continued to require Medicare intermediaries and carriers to forward magnetic tape billing data by mail or messenger to Baltimore, even though a network (Blue Cross Association wire network) exists to transmit the data.

Total rate submissions and associated reports will usually be received and filed in hard copy form. Microfilm could be used to reduce the storage volume requirements, especially for inactive (archival) data. Portions of the submitted data may be converted to machine-readable form, and stored on magnetic tape, magnetic disc packs, or other media for subsequent computer processing. Most billing data and discharge abstract data (except for narrative-type data) may also be converted by the recipient agencies into tape or disc records.

The input data classifications listed in Table 2-III will, with minor changes, serve as designators for the main PRSIS files, including both mandatory (core) data, and also possible file enhancements (optional) data needed if the PRSIS provides support to processing bills, making reimbursements, health care planning, and related functions.

The overall structure and organization of filed information will depend upon the environmental scenarios and PRSIS options to be discussed in Chapters 3 and 4.

2.4.4 Data Processing

Most of the data processing required in the PRSIS is expected to involve handling, converting, rearranging, filing, comparing, extracting, and summarizing relatively large amounts of data. More complex computational processes may be required in setting up a new PRS function, or in some evaluative or research tasks.

There is currently a range of central processor units available that extend in price upwards from the new microcomputer units selling for $1,000 or less to more conventional units over 100 times as expensive. The quite low costs possible for such equipment can be misleading, however, since to make the central processor operational, it must be provided with input/output and bulk storage devices, which will dominate the costs of small computer configurations.

At the present time, the minimum purchase price for a standalone computer with keyboard, CRT display, output serial printer and tape or disc storage is $6,000 to $12,000. A highly "intelligent" terminal can be obtained within the same price range.

2.4.5 Output Document and Report Preparation

The requirements for output printing in the core PRSIS appear rather modest by contrast with those for other data processing functions: it is not expected that PRS will generate massive data outputs. There is, however, a systems design and policy question concerning what kind of reports should be furnished to the providers, to the other planning and regulatory agencies, and to federal policy, monitoring and research groups.

A number of different reporting modes may be appropriate:

- Periodic reports containing provider data in the form of detailed listings, or summaries only, or statistical samples only.
- Reports containing provider data, and triggered by an exceptional event, such as an out-of-tolerance condition.
- Reports, perhaps periodic, summarizing PRS data structures, provider classifications (including peer groups as appropriate), econometric and other working data developed or utilized in the PRS process.

An alternative to preparing and sending reports is making all or part of the PRS data base available to another agency, or set of agencies, having a suitable need-to-know. The data could be furnished through a magnetic tape or disc pack copy of the PRS file, or by making an on-line PRS file accessible to suitable query terminals.

Another kind of computer application that may be of interest to PRS agencies is computerized text editing and printing. Rate setting policies, standards, handbooks and manuals for providers may be entered into the computer, stored, and printed out on request. With a suitable text editing program, and an on-line access terminal, changes in text can be easily entered. Here a large volume of printout may be required at irregular intervals, perhaps involving alternative versions of the text.

2.4.6 Providing Responses to Queries

The PRSIS files (both manual and computerized) may be queried by RSA personnel, or as privacy considerations permit, by persons from external agencies. Queries may be by several descriptors, used singly or in combination. Some of the descriptors commonly used in formulating queries should be: provider, date, patient/enrollee, case identifier, diagnosis, and bulk purchaser.

Capabilities for providing responses to *ad hoc* queries are a partial alternative to the printing out of regularly scheduled documents or reports, or of data-base-triggered reports by exception. Whether there is a need for rapid response to such queries (i.e., a response in a fraction of a minute) is not clear. The core PRS functions do not appear to demand quick response, but nevertheless could utilize it if it is available. It seems that many types of applications can be organized either way.

On the one hand, there is the example of the data processing system for the Medicare program, which utilizes master files in magnetic tape form, and generally provides overnight response to batched queries submitted by carriers and intermediaries. On the other hand, there is now an increasing use in the data processing field, in almost all types of applications, of random-access bulk storage and on-line terminals for handling queries, general data inputs and some types of general data outputs.

It appears that whether on-line query response is provided in the computerized portion of the PRSIS may depend upon other aspects of the system, such as what method of data entry is used.

3. INFORMATION SUBSYSTEMS SERVING AN INDIVIDUAL RATE SETTING AGENCY

Chapter 3 deals with environmental scenarios and design options from the standpoint of a single, generic RSA; by contrast, Chapter 4 takes the national viewpoint.

The major building blocks of the Prospective Rate Setting Information System (PRSIS) will be the information subsystems serving individual Rate Setting Agencies (RSAs). These information subsystems are developed in this chapter. The type of subsystem that will be required to support Prospective Rate Setting (PRS) and related functions depends upon the characteristics of the individual RSAs, as well as the nature of PRS and the environment. Information about the individual RSA is presented in Section 3.1. Functions of the RSA and its interfaces with other planning and regulatory agencies are summarized in Section 3.1.1. Variations among RSAs, with emphasis on variations in the size of the workload, are discussed in Section 3.1.2. The principal variables used to describe PRS and the health environment are identified in Section 3.2. A set of environmental scenarios is constructed in Section 3.3 and subsystem options are defined in Section 3.4. The relation between environmental scenarios and subsystem options is discussed in the final section. An illustrative subsystem configuration is presented in Appendix C.

3.1 The Individual Rate Setting Agency

While rate setting has been commonly performed at the state level, the Rate Setting Agency (RSA)* described in this chapter may serve an area (sub-state), a state, a region or conceivably, the entire nation. It is a general, somewhat conceptualized RSA described in terms of its functions and its relation to the health care environment.

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*In some cases, rate setting has been performed not by a single agency, but by two agencies (e.g., a state agency and a Blue Cross Plan) working in concert.

3.1.1 Functions of the Rate Setting Agency

The primary function of the Rate Setting Agency (RSA) is, of course, to set provider rates. Related functions include providing technical assistance to providers in preparing rate setting submissions and reporting to federal agencies as required. The RSA also has functional interactions with other planning and regulatory agencies. In particular, the RSA may interface with the review of Capital Expenditures and changes in Services (CES), may cooperate with or play an active role in state and area planning and may possibly participate in the activities of Professional Standards Review Organizations (PSROs) at the (sub-state) area, State Council and National Council levels. The primary and interfacing functions of the RSA are summarized below and listed in Table 3-I. Interfacing functions are identified from the point of view of activities performed by the RSA. (A detailed discussion of the functions of planning and regulatory agencies may be found in Volume I.)

The prospective rate setting function, as now carried out on an operational or experimental basis, has many possible variations depending upon the approach to rate setting, the basis of payment to providers, the types of formal incentives (if any) utilized, adjustments (if any) made, the degree and type of monitoring activities performed, and the nature of the appeals process. In general, however, once the initial program planning, development and other preparational work has been completed, the

TABLE 3-I

FUNCTIONS OF THE RATE SETTING AGENCY

I. PRIMARY FUNCTION: RATE SETTING

  A. Set Provider Rates

    (1) Conduct initial desk review
    (2) Screen cost and activity (volume) allocations
    (3) Analyze out-of-tolerance items
    (4) Make rate decisions and prepare supporting documentation
    (5) Participate in hearings, appeals and litigations
    (6) Monitor provider activities (volumes), costs and revenues.

  B. Provide Technical Assistance to Providers in Meeting Rate Setting Requirements

  C. Report to Federal Agencies

II. FUNCTIONS WHICH INTERFACE WITH OTHER AGENCIES

  A. Review of Capital Expenditures and Changes of Services (CES)

    (1) May participate in process
    (2) May approve, reduce or deny reimbursement for approved capital expenditures and changes in services

  B. State and Area Planning - cooperate in planning for availability, delivery and utilization of health services

  C. Professional Standards Review Organizations (PSROs) -- may exchange data with Area PSROs, the State Council or possibly the National Council on-going rate setting operation is comprised of some or all of six major tasks, as summarized below.

(1) The first task, after soliciting and receiving provider rate submissions, is to conduct a desk review of each submission, including all back-up material.

(2) Next, the material may be screened to determine the reasonableness of the provider's budget -- including costs and revenue as well as levels of activity (volumes). Activity screens often take the form of prospectively determined utilization minima. Cost screens may be based on an institution's historic costs or on a comparison of "similar" institutions.

(3) Out-of-tolerance items must be analyzed, either through a budget review "by exception" or through the application of various detailed tests. (In a pure formula approach, this step may be omitted.) A PRS audit may also be carried out at this time, either by the RSA staff or by outside auditors at the request of the staff.

(4) Next, the rate setting decisions are made and documented. The rates are reported to the providers, covered purchasers and federal agencies.

(5) An appeals process may take place following an annual rate change request or following a rate adjustment request.

(6) Once the rates have been established, the RSA usually monitors the provider's utilization, cost reports, and sometimes provider bills as well, for rate compliance. Clinical data may also be required for the monitoring of case mix. In some rate setting programs, rate adjustments may be allowed if there are sizeable changes in volume, case mix, or certain price levels.

In addition to the rate setting tasks summarized above, the RSA may provide technical assistance to providers in preparing rate submissions. The RSA may also be involved in establishing, or helping to establish, standardized accounting, budgeting, and reporting systems to facilitate the rate-setting process.

In addition to its major rate setting function, the RSA also interfaces with health planning agencies responsible for the CES process and general health planning. The basic objectives of the CES process are to limit unjustified, large capital expenditures, and unnecessary changes in bed size and services, and to help fund justified projects, all of which have a direct relationship to the functions of the RSA. The RSA may actually participate in the process or may cooperate with the CES agency by abiding by its decisions. (It is also possible, however, for an RSA to deny or reduce reimbursement for capital expenditures or changes in service which have been approved through the CES process.)

It is desirable for the RSA to work with area health systems agencies (HSAs) and state health planning and development agencies in planning for the availability, delivery and utilization of health services. Since some data and analyses are common to both the rate setting and planning functions, exchanges of data are useful to both types of agencies.

Although it is unlikely that PSROs will participate directly in prospective rate setting (PRS), PSRO reports could be useful to rate setters in making inter-provider comparisons and evaluating the cost-effectiveness of provider services relative to regional norms. The RSA might play a role in disseminating regional norms to providers and providing technical assistance in the utilization of these norms.

3.1.2 Variations Among Different Possible Rate Setting Agencies

The size and concentration of the Rate Setting Agency (RSA) workload is critical in designing the RSA subsystem of the prospective rate setting information system (PRSIS). Variations in workload size among RSAs are described in this section for state and (multi-state) regional RSAs. One way of assessing the concentration of the workload throughout the year is also examined.

For a given approach to performing the PRS function (approaches will be discussed in Section 3.2), the annual workload for an RSA depends chiefly on the numbers and types of institutions that it regulates. Typically, the six basic functions or tasks identified in the last section (see part I.A.a. of Table 3-I) are performed for each institution every year -- except for item (5), hearings, appeals and litigation. Here only hospitals and nursing homes will be considered -- these normally constitute the principal workload for rate setting. The basic workload data is summarized in Table 3-II.

The number of hospitals and nursing homes varies markedly between states. The number of hospitals of all types varies from 14 (Delaware) to 572 (California). The number of nursing homes (Class I) and homes offering personal care with nursing (Class II) varies from 8 (Alaska) to 1373 (California). If PRS regulations

TABLE 3-II

VARIATIONS IN SIZE AMONG POSSIBLE RATE SETTING AGENCIES

	Range[1]							
	State				Region			
	Minimum		Maximum		Minimum		Maximum	
	No.	State	No.	State	No.	Region	No.	Region
NO. INSTITUTIONS[2]								
Hospitals (1972)								
General Medical & Surgical	9	Del.	572	Calif.	282	X	1153	V
Other	1	N.D. N.H.	85	N.Y.	25	VIII	216	V
Total	14	Del.	643	Calif.	309	X	1369	V
Nursing Homes (1971)								
Class I: Nursing	7	Alaska	1,373	Calif.	460	VIII	3072	V
Class II: Personal Care with Nursing	1	Alaska Nevada	462	Calif.	109	X	733	V
Total I, II	8	Alaska	1,835	Calif.	636	VIII	3805	V
Class III: Personal Care without Nursing	0	Alaska	2,333	Calif.	83	VI	2429	IX
Class IV: Domiciliary	0,1	Several	109	Calif.	4	VII	112	IX
Total I-IV	8	Alaska	4,277	Calif.	768	V	4534	IX
Hospitals & Nursing Homes								
(Classes I, II)	36	Alaska	2,953	Calif.	962	X	5174	V
SIZE[3] (sq. miles)	1,049	R.I.[4]	566,432	Alaska	57,395	II	577,887	VIII
POPULATION[3] (1970)	302,173	Alaska	19,953,134	Calif.	5,577,375	VIII	44,057,747	V

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[1] State Data includes the District of Columbia.

[2] Source: U. S. Department of Health, Education and Welfare, Public Health Service, Health Resources Administration, National Center for Health Statistics. Health Resources Statistics, DHEW Publication No. (HSM) 73-1509 (Washington, D.C.: U. S. Government Printing Office, 1974).

[3] Source: U. S. Bureau of the Census, Congressional District Data Book, 93rd Congress (A Statistical Abstract Supplement) (Washington, D.C.: U. S. Government Printing Office, 1973.) Issued as part of the publication program of the 1970 Census of Population and Housing.

[4] Excluding the District of Columbia.

cover all types of nursing homes (the above, as well as homes providing personal care without nursing and domiciliary homes) the number ranges from 8 (Alaska) to 4277 (California). Unless otherwise specified, it will be assumed that when PRS is specified as being mandatory for nursing homes only Class I and Class II will be included.

The median number of institutions per state is 129 hospitals (Kentucky) and 206 nursing homes (Louisiana). Only three states have more than 350 hospitals (California, 643; New York, 422; Texas, 575). Six states have more than 500 nursing homes (California, 1835; Illinois, 812; Massachusetts, 813; Ohio, 1098; Pennsylvania, 730; Texas, 891).

The number of institutions also varies markedly by federal region (map, p. 3-10). The total number of hospitals ranges from 282 (Region X) to 1153 (Region V). The total number of nursing homes ranges from 636 (Region VIII) to 3805 (Region V).

In the entire United States, there are 7481 hospitals, and 16,439 Class I and Class II nursing homes.

The size of the RSA workload may also be somewhat affected by the area and population that the RSA serves. States vary in area from 1,049 square miles (Rhode Island) to 566,432 square miles (Alaska). In 1970, population varied from 302,173 (Alaska) and 332,416 (Wyoming) to 18,241,266 (New York) and 19,953,134 (California). The comparative size of Federal Regions may be seen in Figure 3-1. The number of states in a Federal Region varies from 4 to 8.

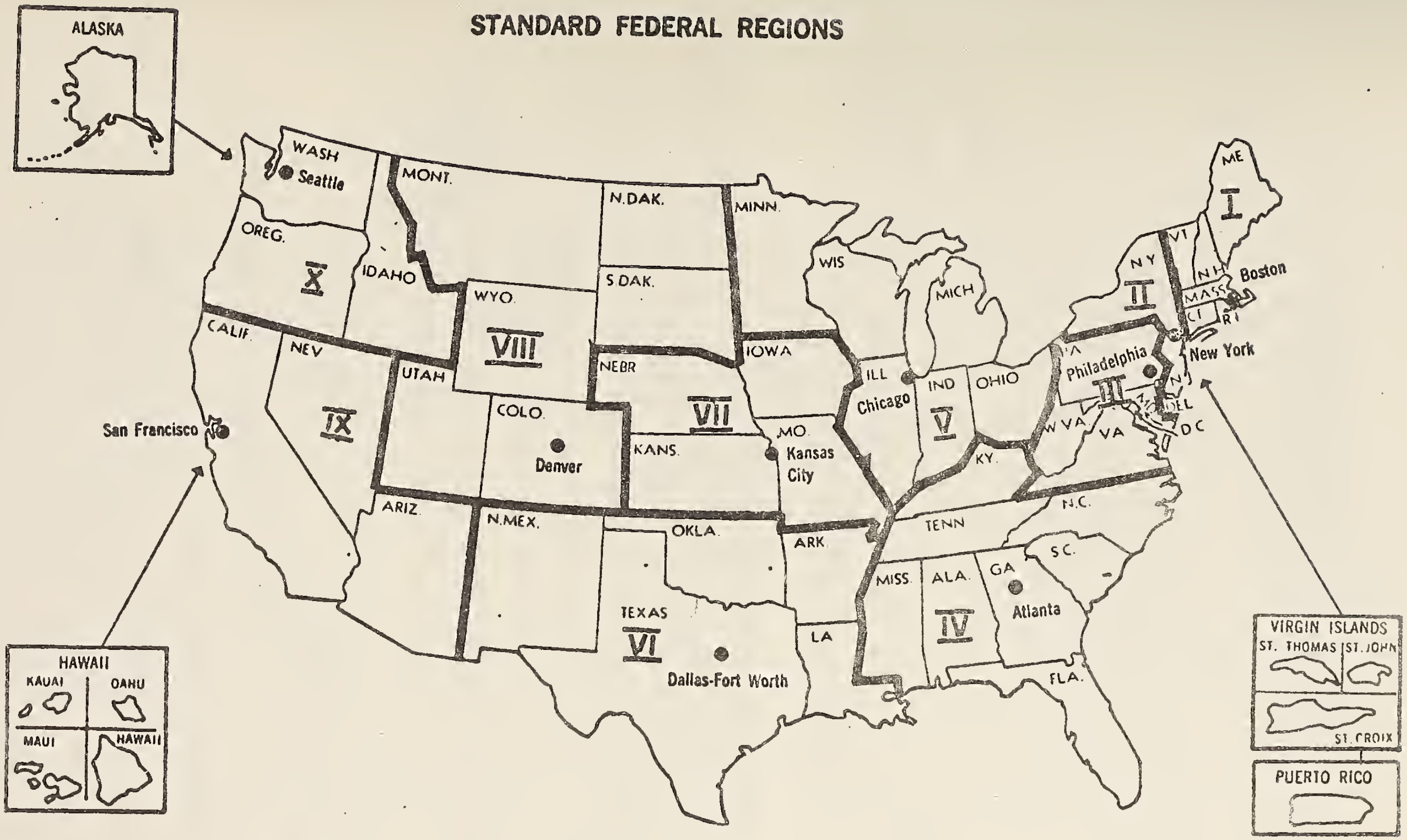

Figure 3-1
Standard Federal Regions

Source: United States Government Manual 1975/1976 (Washington, D. C.: U. S. Government Printing Office, revised 1 May 1975), p. 784.

The workload of an RSA will usually not be distributed uniformly throughout the year. For many rate setting approaches, the effort of Tasks (1) through (4)* for each regulated institution is concentrated in the 2-4 month period prior to the start of the institution's fiscal year. Fiscal years of institutions in a given RSA jurisdiction may be synchronized, or may start at different times. Some states (e.g., Massachusetts) require all hospitals to use the same fiscal year (starting October 1) and all nursing homes to do likewise (starting January 1). At the other end of the spectrum are states (e.g., Kansas, Missouri) which permit all hospitals and nursing homes to elect their own fiscal years, so long as they are consistent from year to year.

3.2 Principal Prospective Rate Setting Variables

The principal variables used to develop the set of Rate Setting Agency (RSA) viewpoint scenarios are identified in Table 3-III and are described briefly below. Two major classes of variables were employed -- first, those used to describe the health care environment in which the RSA must function and second, those used to describe prospective rate setting (PRS) -- and also the prospective rate setting information system (PRSIS) -- at the RSA subsystem level.

3.2.1 Environmental Variables

The five variables that are utilized to characterize the environment for PRS are described below.

1. Number of Bulk Purchasers (Third Party Payors)

The present system of health care may be described as

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*See part I.A. of Table 3-I.

TABLE 3-III

MASTER LIST OF VARIABLES FOR RATE SETTING AGENCY VIEWPOINT SCENARIOS

ENVIRONMENTAL VARIABLES

1. Number of Bulk Purchasers (Third Party Payors)

   Present Number, Reduced Number, Only One
   All Included, or Only Some Included

2. Basis of Provider Participation

   Voluntary
   Mandatory

3. Degree of Standardization of Provider Accounting and Reporting

   Not Standardized
   Partially Standardized - standardized accounting principles and reporting format
   Fully Standardized

4. Degree of Standardization of Bills and Discharge Abstracts

   Bills not standardized; standardized
   Discharge Abstracts not standardized; standardized

5. Level at which Prospective Rate Setting is Performed

   State
   Regional (multi-state)
   National

PROSPECTIVE RATE SETTING AND PRSIS* (Subsystem Level) VARIABLES

6. Basis of Payment

   Methods Providing Equity - Detailed Charges, Case by Diagnosis
   Summary Methods not Providing Equity - Budget Allocation, Per Diem, Per Admission

7. Analytical Approach

   Degree of Detail - Detailed Budget Review or Formula
   Scope of Comparisons - Historical only, or Historical plus Comparisons with Peer Groups and/or Norms

8. Adjustments or Settlements Allowed

   Spectrum extending from Firm Fixed Price to Complete Pass-Through of Cost Changes a multi-payor system since health care is purchased by a number of public assistance agencies and insurance carriers (private and governmental). The major purchasers (described in detail in Volume I) are Medicare (Title XVIII), Medicaid (Title XIX), the Maternal and Child Health Program (Title V), Blue Cross and Blue Shield, Commercial Insurance Companies, the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS), Workmen's Compensation, and some Health Maintenance Organization (HMOs).

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*PRSIS - Prospective Rate Setting Information System

The PRS system may encompass all purchasers, or only some may be involved.

If some form of National Health Insurance (NHI) is enacted in the future, the number or character of purchasers could change. Forms of NHI which make only small perturbations in the present system would preserve the present types and number of purchasers. By contrast, some comprehensive forms of NHI could make the Federal or state government the only purchaser. Forms of NHI intermediate between these extremes may preserve a multi-payor system, but with a reduced number of bulk purchasers.

Since PRS involves the purchasers as well as the providers, the purchaser structure is an important factor in the rate setting process. For example, obtaining equity of charges among different purchasers, frequently cited as a major PRS goal, may be difficult or trivial depending upon the purchaser structure.

2. Basis of Provider Participation

It is conceivable that provider participation in the PRS system may be voluntary or mandatory for each class of providers. Mandatory participation for a class of providers signifies that each member of the class must participate in PRS. In a given RSA jurisdiction, for example, regulations might specify that all hospitals are required to participate in PRS (or frequently, PRS may be applied only to non-Federal institutions). Voluntary participation signifies that providers have some degree of choice about whether to participate in PRS. Several PRS experiments have been conducted on a voluntary basis. Voluntary participation could also arise, for example, if the Federal Government required providers to take part in PRS or lose Federal reimbursement for specified programs. The provider has a choice in this case, although it is unlikely that many providers would be willing to forgo federal reimbursement.

The basis of provider participation may vary among classes of providers in a given RSA jurisdiction. For example, participation might be mandatory for hospitals but voluntary for nursing homes.

A voluntary, instead of mandatory, approach in a given RSA jurisdiction, could lead to fewer providers participating and hence a smaller PRS workload. More importantly, however, a voluntary approach could seriously limit the program's effectiveness.

In order to make interinstitutional comparisons, the RSA needs to have budget and other provider submissions in a standard form. That is, such comparisons require standardized reporting. Presumably they also require that the underlying accounting data be structured according to a uniform chart of accounts.

At the present time, the degree of standardization ranges from not standardized in many states to fully standardized hospital accounting and reporting in a few states (e.g., California, Washington). Many hospitals base their chart of accounts on the suggested chart outlined in the American Hospital Association's (AHA's) 1966 Chart of Accounts.* Many nursing homes base their chart of accounts on that of the AHA with non-applicable categories (e.g., operating room) removed, or on the chart of accounts suggested by the American Nursing Home Association.* Since providers have made many changes in the numbering system and the accounts, the use of the same chart of accounts as general guide only does not constitute standardization.

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*American Hospital Association, Chart of Accounts for Hospitals (Chicago, Illinois: 1966). A draft revision was prepared in 1975.

Partial standardization will be taken to mean that reporting is standardized throughout the RSA jurisdiction for at least one major class of institutional provider (usually hospitals). If accounting and reporting are standardized throughout the RSA jurisdiction for all major classes of institutional providers, then the phrase full standardization will be used.

4. Degree of Standardization of Bills and Discharge Abstracts

This variable concerns the case-oriented bills and discharge abstracts, rather than the institution-oriented budgets and accounting of variable number 3.

The degree of standardization vs. diversification of billing requirements among different bulk purchasers has a major effect on the complexity of the billing procedures, the difficulty of automating them, and the difficulty of training new billing personnel. It impacts on PRS only to the extent that PRS utilizes sampled bills for monitoring purposes, or that PRS and provider reimbursement are directly associated.

Billing procedures are not standardized at the present time. Each third party payor has its own procedure for reimbursing the provider and its own billing and reimbursement forms. In some cases, a given third party payor uses more than one form (e.g., different forms for inpatient and outpatient services or for different coverage plans). Full standardization of billing, that is, the use of only one billing form by all purchasers, and for all coverage plans and types of institutional service, may be established in the future. A major standardization effort has been under way for some time.*

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*American Nursing Home Association, Uniform Chart of Accounts for Long-Term Care Facilities (Washington, D.C.: 1974).

If a form of national health insurance is enacted with a reduced number of purchasers, or especially with only a single purchaser, the standardization problem could be much simplified.

Discharge abstracts may be involved in the PRS function if measurements of case mix are necessary either to set the basic rates, or to determine allowed adjustments to such rates. At the present time a number of abstract forms (and corresponding data sets) are in use, most forms being tied in with a data processing service or a federal data collection requirement. Discharge abstracts are also a major input to PSROs. As in the case of bills, efforts are currently under way to establish a standard discharge abstract, or at least a standard minimum basic data set.

5. Level at which Prospective Rate Setting is Performed

The primary functions of the RSA are to set new rates and monitor provider compliance with established rates. This activity can occur at the (sub-state) area, state, (multi-state) regional or (central) national level. States could be aggregated into regions in several ways but for the sake of concreteness the regions specified in this report will be the 10 federal regions (map, page 3-16).

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*A coordination effort, popularly known as UB-16, has been underway for some time.

PRS could be performed at the state level by a state agency, a semi-autonomous commission, or a private contractor such as a Blue Cross Plan. At the regional level, PRS could involve a federal office, a commission, or a private contractor. Centralized PRS would presumably be done only by a federal agency. (It should be noted that PRS functions could also be divided among 2 or more levels.)

The level at which PRS is performed in the future will be determined primarily by the governing legislation (Federal and/or State). The level has a major effect, of course, on the size of the RSA workload, as was discussed in Section 3.1.2. It also determines the average degree of geographical remoteness of the RSA from the providers that it regulates.

3.2.2 Prospective Rate Setting and PRSIS (Subsystem Level) Variables

Three variables are utilized to classify the approach taken in carrying out the PRS function. These are described below.

6. Basis of Payment

The basis of payment defines the unit according to which the rates are set and upon which payments are determined. Specific bases of payment are detailed charges, total case charges by diagnosis, all-inclusive per diem, per admission, and budget allocation. All of the bases are applicable to acute care, but case by diagnosis and per admission are difficult to apply to chronic care. These bases of payment may be divided into methods providing equity on a case-by-case basis to all payors and summary methods not providing such equity. Only two bases inherently provide equity: detailed charges, in terms of resources utilized; and case charges by diagnosis, in terms of output or intended results. (Other bases could provide equity through the use of suitable corrections.)

Payment based on detailed charges requires large amounts of data on bills, but is straightforward to apply and in widespread use. Case by diagnosis has certain advantages in principle, since it focusses on results or outputs, but this approach is still in the experimental stage. One complication is the likelihood that there will always be a certain subset of actual diagnoses which either defy classification or else require, by _ad hoc_ application of medical judgement, widely varying modes (hence costs) of treatment. Upon closer statistical examination on this problem might, however, be shown to be relatively minor.

All inclusive per diem is also being widely used. It has the drawback of encouraging long lengths of stay, and not taking into account adequately variations in intensity of care. (Usually different per diems are established for different modes of service -- e.g., general medical and surgical vs. intensive care, or skilled nursing vs. intermediate care.) Payment for inpatient care based solely on number of admissions may tend to discourage use of less expensive outpatient services, so that monitoring of admissions standards and practices would be necessary.

Payment based only on an approved budget level (budget allocation), takes no account of unforeseen changes in caseload or case mix during the budget period. In pure form its applicability is rather limited.

7. Analytical Approach

The approach that is taken by the rate setting agency in reviewing and analyzing provider rate submissions may be categorized for present purposes in terms of degree of detail and scope of comparisons.

The amount of detailed information utilized in rate determinations varies from the use of a _formula_ composed of highly aggregated indices and parameters of provider costs to an item-by-item examination of a detailed budget. At the extreme of minimal detail, one could examine only the rates themselves (or total costs and revenues) coupled with an appropriate set of inflation factors. In addition, one could establish limits on reimbursable costs for the entire budget or for specific cost centers. For a PRS approach involving one or more cost and productivity screens followed by a detailed examination of out-of-tolerance items, the degree of detail involved could be specified in terms of the percent of the rate submission or budget on which detailed review is performed. Although in principle screening can apply to highly disaggregated cost items, in practice there are limits to the amount of screening that is feasible or advantageous.

There are essentially three types of comparisons utilized in screening and rate review -- between different cost centers in a provider budget, between a provider and other members of its peer group or general standards, and between budget year and previous years. A PRS method will, in general, include combinations of these. For example, cost center comparisons within a provider for the budget year, peer group comparisons for the budget year, and historical (year-to-year) comparisons for cost and productivity data both within a provider and relative to the appropriate distribution for its peer group may all be applied.

8. Nature of Allowed Adjustments

The rate setting approach may provide for adjustments in previously established rates under certain conditions, or may instead require that rates be held firm during a prescribed period -- typically a budget year. Also, there may or may not be provision for some kind of year-end settlement, after final audited accounting figures are available.

Three basic cases for adjustments of rates are: 1) no adjustments are permitted during the budget period; 2) adjustments are made regularly based on changes in volume, case mix, price indices or other factors which formally relate cost elements to the pre-established rates; and 3) prospective changes in the rates may be made only when justified by major unforeseen events or conditions.

The nature of the permitted adjustments is a major determinant of the incentives placed on the provider to control costs.

Once rates have been prospectively established on the basis of a budgetary submission by the provider, the rate setting agency will usually want to monitor actual accounting data (utilization, costs, revenues) to compare with budget estimates. The RSA may also need to monitor discharge abstracts or bills to review case mix, or verify that approved rates are actually being utilized. The requirements for monitoring are in large part determined by the nature of allowed adjustments.

3.3 Scenarios from the Rate Setting Agency Viewpoint

Six major scenarios have been developed using the variables discussed in the previous section. The scenarios are displayed in Table 3-IV, and are labelled A through F.

Scenario A is based on the present multi-payor health system. Provider participation in PRS is voluntary. Only some payors are included in the system. Provider accounting and reporting are not standardized and a multiplicity of billing and discharge abstract forms and procedures are in use. PRS is performed at the State level. Payment is, in most cases, based on detailed charges,

TABLE 3-IV

SCENARIOS FROM RATE SETTING AGENCY VIEWPOINT

<table>
<tr><th rowspan="2">VARIABLES</th><th colspan="6">SCENARIOS</th></tr>
<tr><th>A</th><th>B</th><th>C</th><th>D</th><th>E</th><th>F</th></tr>
<tr><td>ENVIRONMENTAL VARIABLES</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>1. No. of Bulk Purchasers</td><td colspan="4">← Present Number →</td><td>Few</td><td>One</td></tr>
<tr><td>All included, or only some included</td><td colspan="3">← Some →</td><td colspan="3">← All →</td></tr>
<tr><td>2. Basis of Provider Participation</td><td>Voluntary</td><td colspan="5">← Mandatory →</td></tr>
<tr><td>3. Degree of Standardization of Provider Accounting and Reporting</td><td>Not Std.</td><td>Partial Std.</td><td colspan="4">← Fully Standardized →</td></tr>
<tr><td>4. Degree of Standardization of Bills and Discharge Abstracts</td><td colspan="3">← Not Standardized →</td><td colspan="3">← Fully Standardized →</td></tr>
<tr><td>5. Level at which PRS Function is Performed</td><td colspan="4">← State →</td><td>State, Other?</td><td>National, Regional, State</td></tr>
<tr><td>PRS/PRSIS VARIABLES</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>6. Basis of Payment</td><td colspan="4">← Equity Only →</td><td>Equity, or Summary</td><td>Any</td></tr>
<tr><td>7. Analytical Approach
Degree of Detail
Scope of Comparisons</td><td colspan="5">← All approaches applicable →</td><td>Note (1)</td></tr>
<tr><td>8. Adjustments or Settlements Allowed</td><td colspan="5">← All approaches applicable →</td><td>Note (1)</td></tr>
</table>

Note (1): At national and regional levels, high detail and complex adjustments not appropriate.

providing equity among purchasers. The analytical approach may be based on the use of either a formula or a detailed budget, and all types of comparisons are applicable. Any type of adjustment approach and mechanism may be used.

Scenario B is closely related to Scenario A and is also based on the present system. The differences are that provider participation is mandatory in B and provider accounting and reporting are partially standardized. There are precedents for this case (see Section 3.2) and more states can be expected to develop standardized charts of accounts, at least for hospitals. Scenario B might result if PRS legislation were enacted making PRS mandatory and specifying a chart of accounts and accounting procedures for providers.

Scenario C requires uniform accounting and reporting procedures and might arise if PRS legislation were stronger than in Scenario B. These procedures could of course vary between states but would be uniform within a state.

All payors are required to participate in Scenario D and bills and discharge abstracts are fully standardized. This could be obtained only through suitable legislation.

The four scenarios just described, A through D, comprise a sequence of environments that differ progressively in the degree of control and standardization. Each environment derives from a particular type of regulatory legislation; all environments could be compatible with a modest (non-drastic) form of National Health Insurance (NHI).

Scenarios E and F pertain to an environment in which enactment of NHI changes the payor structure. Some of the current NHI bills would result in a multi-payor system with a reduced number of purchasers. In Scenario E, the number of bulk purchasers is smaller than the present number. PRS could be performed at the state level or possibly at the regional level. Either a summary or equity basis of payment could be appropriate, depending upon variation among purchasers in enrollee characteristics and coverage plans.

A strong Federal form of NHI is reflected in Scenario F. Here the Federal Government is the only bulk purchaser and provider procedures are standardized. Payment on the basis of detailed charges must remain in effect or a summary procedure could be used. PRS could be performed at any level. A formula approach to PRS analysis was chosen to facilitate national or regional rate setting and federal monitoring of provider compliance with approved rates. If PRS were performed at the regional or national level, a large number of institutions would be available for inter-provider peer groupings, permitting massive but complex comparisons. Workload considerations would favor either a fixed price arrangement or adjustments of an automatic type, not requiring special rate submissions.

3.4 Rate Setting Agency Information Subsystem Options

This section discusses optional approaches to the design and implementation of a PRSIS subsystem that supports a single rate setting agency. The options are considered from a very broad point of view; detailed alternatives and choices will be analyzed in a subsequent report. Although, as discussed in Chapter 2, the PRSIS subsystem could be entirely manual, the designs of greater interest are likely to be automated to some degree. The use of the phrases data processing configuration and data processing facility in the subsequent discussion is not meant, however, to imply any particular degree of computerization.

3.4.1 Definition of Options

Four design options are defined in terms of the scope of applications supported by the data processing PRSIS subsystem. These are denoted p, q, r and s, and are represented diagramatically in Figure 3-2.

Option p In this case, the data processing configuration is designed to support PRS only, and is therefore dedicated to that function. The PRSIS will, in general, exchange data with other processing facilities that support planning, regulatory and administrative functions related to PRS (such functions as health care planning, CES review and claims or bills processing).

Option q The data processing configuration in this design option is dedicated to the joint support of PRS and closely related planning and regulatory functions. Here the design can take advantage of the functional interactions and interrelated data requirements of these activities.

Consider particularly combining support to health care planning and CES review with support to PRS. Such a composite data processing operation would benefit all participants and could help eliminate a source of confusion to providers. RSAs can contribute additional financial expertise to planning and CES review agencies. These agencies, in turn, can provide data by service area on facilities, services and utilization, and can work with RSAs in analyzing the overall service and cost impact of proposed capital projects and changes in service.

While Option q is primarily defined only on the basis of sharing an information system, the agencies involved could also be administratively coupled. This would help

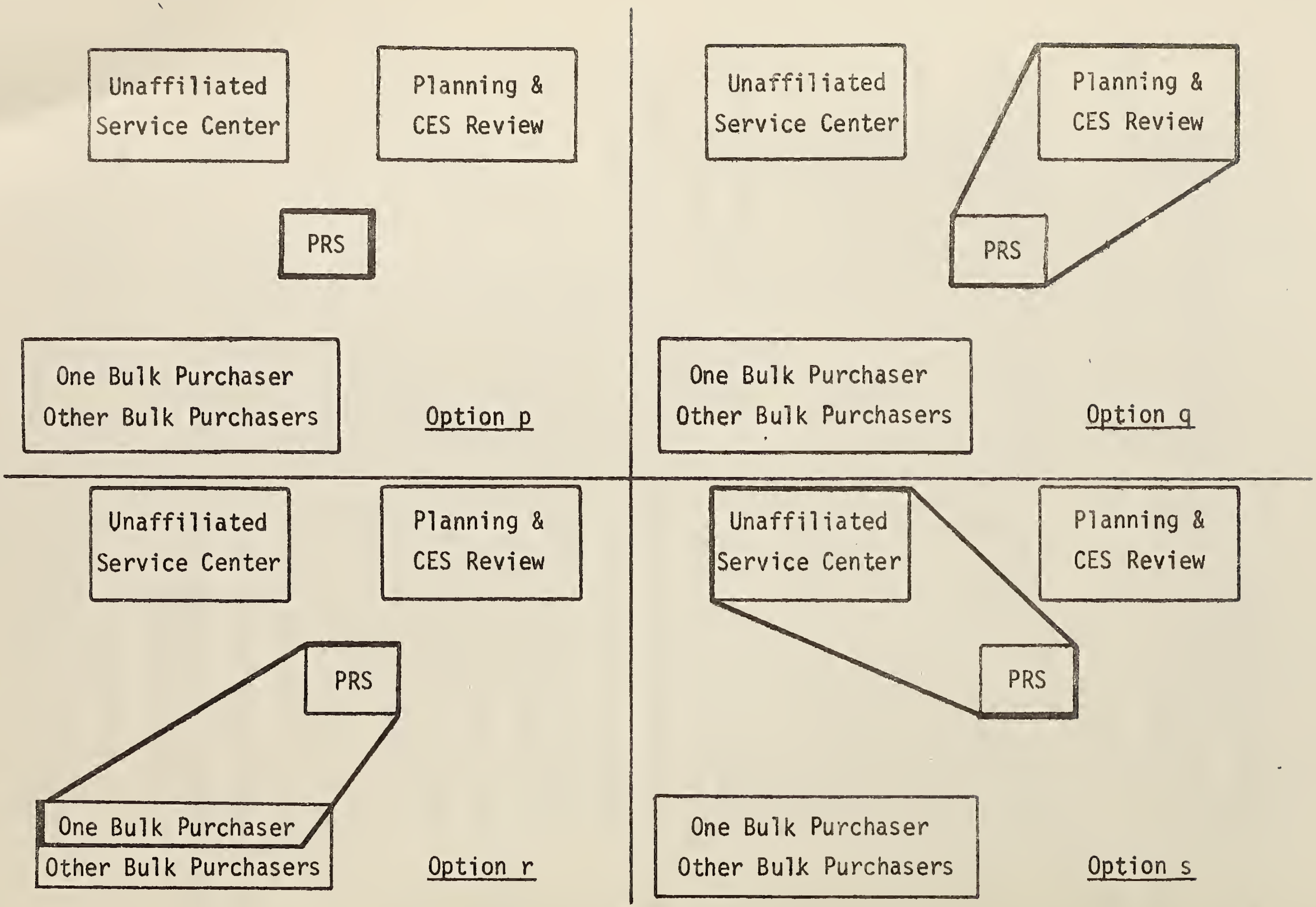

Figure 3-2

Pictorial Representation of Design Options avoid some operational confusion: there have been cases where an RSA would not approve charge components based on new facilities and services already approved by planners and CES reviewers, and cases where increased rates were established based on charges of facilities and services that had been disapproved. Needless to say, integration could help prevent such confusion. Two organizational models for coordinating rate setting with planning and CES review are a central administration (one agency) or coordinated separate agencies with separate heads. Coordination could be accomplished through procedural linkages whereby one agency would accept the decisions of the others and seek inputs from the others, and the agencies would exchange data, link sanctions, and cooperate in monitoring (for example, the RSA would report violations of CES review decisions to the planning agency). The RSA might make its data available by providing reports on a regular or ad hoc basis, by giving a copy of (part of) its data base to planning agencies, or by allowing planners to make direct terminal-to-data-base inquiries. Option q could be extended beyond the agencies just discussed to incorporate support of facility inspection and licensing, and perhaps even modest types of processing support to providers.

Option r Here the PRS information support is provided by a bulk purchaser such as a Blue Cross Plan, a commercial insurer, or a state Medicaid office. This is different from the option just discussed not only because the data interactions are different, but also because the bulk purchasers are parties to the rate setting agreement. Moreover, except in the case where National Health Insurance establishes a single bulk purchaser (Scenario F of Section 3.3), any one bulk purchaser represents only a portion of the insurance and public assistance payments for institutional health care. Because of these factors, Option r may lead to conflicts of interest. These could be minimized, however, by clearly defining data functions for each party and by careful design of data handling procedures and file access rules.

In respect to the data processing involved in Option r, it should be noted that the annual processing workload for the bulk purchasing function* tends to be much larger than that for PRS, and to be more uniformly distributed throughout the year. Thus the bulk purchaser activities would tend to dominate in system design and operation. There could be some operational advantage in associating bulk purchaser processing of claims and bills from providers, and PRS monitoring of providers. But this advantage might be largely negated by the limited scope of payments by a single bulk purchaser. The main benefit of Option r would be that the RSA could acquire access to both data processing facilities and technical expertise.

One special case of Option r should be noted. This is where the rate setting is performed by a bulk purchaser (e.g., a Blue Cross Plan), instead of a government agency or independent commission. In this case, Option r would be selected automatically.

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*This assumes that the bulk purchaser accounts for a significant percentage of all third party payments.

Option s For this option, PRS information support is obtained by means of a data processing service center (but not one operated by a bulk purchaser). The center could be one operated by a state or Federal agency, a university or a commercial concern. It is assumed that the other applications supported by the service center are not associated with PRS through data exchange, although there could be association through shared procedures or joint use of generic computer software. Thus in this Option, like Option p, the PRS information support is isolated from support of related planning, regulatory and administrative functions. Because of the facility sharing in Option s, however, its data processing configuration and economics may be quite different from those of Option p.

In connection with Option s (and also Option r), it should be pointed out that a service center offers equipment (processing capability and peripherals); technical personnel and possibly clerical personnel as well; and may even provide the software necessary to do PRS. Whether to use a service center and which type of facility to consider will depend on (1) the requirements for automated data processing support, (2) the number and type of functions to be supported by the information subsystem, (3) the economics of a dedicated compared to a shared system, (4) trade-offs among possible savings in investment and operating costs compared to the lack of control over shared facilities with related concerns about security or privacy. The phase of the subsystem life cycle might also influence the decision to use a shared system since, for example, a service bureau might be used only until an RSA has developed and implemented an acceptable PRS system and information subsystem.

3.4.2 Supplementary Comments

The foregoing set of options characterize alternative design approaches in very broad terms. In the interests of simplicity a number of complications that might easily occur in a real PRSIS design have been omitted. Thus, it has been assumed that dedication or sharing of facilities, and functional isolation or merger are all-or-none choices. Actually various intermediate cases are likely. There are many specialized data services available, as noted in Chapter 2, that organize and tabulate overall hospital utilization and accounting data, carry out cost finding operations, and process discharge abstract data, to cite only three types. Any of the four options could be modified through use of such services. Also the PRS application could be divided into sub-applications, and some of these handled in accordance with one option, and others in accordance with another. These and other appropriate option modifications will be considered in the actual PRSIS design, although they are not discussed further here.

A further comment concerning the design options is required. Regardless of which option is chosen, the designer will probably be faced with a range of sizes of RSA workloads. For example, if PRS is performed at the state level, annual workloads of RSAs may vary by a factor of 50 or 100 to 1. Such a variation in size may call for wide differences in the type of data processing capability that is needed. Thus, although New York and Wyoming might employ the same rate setting methodology, the information processing in one case might require a large automated subsystem for rate setting, and in the other case, might be adequately served by a manual approach. Another important factor is the distribution in PRS processing workload during the year.

In developing a PRSIS subsystem design to support an individual RSA, the designer must of course take into account the environment, as defined by the scenarios introduced in the previous section. Interactions between scenarios and options are discussed below.

3.5 Scenario-Option Relationships

In principle, any of the four system design options p, q, r, s could be utilized with any of the six environmental scenarios A, B, C, D, E, F. Some of the 24 possible combinations could be awkward, however. Thus, if in scenario F, rate setting is performed at the regional or the national level, merging information support to PRS with that for planning or for billing and reimbursement might be difficult because of difference in "level."

The choice of system design option p is strongly influenced by the size of the RSA workload. The automated dedicated system is appropriate only to the larger RSA jurisdictions (i.e., a populous state, a federal region, or the entire nation). On the other hand, a non-automated dedicated system would be appropriate only for the smaller RSA jurisdiction. The other three system design options (q, r, s) could be used with almost any size of RSA jurisdiction.

4. THE NATIONAL SYSTEM

The environmental scenarios and design options pertaining to the RSA viewpoint were discussed in Chapter 3; this chapter develops the national picture.

The nationwide rate setting organization and its functions are discussed in Section 4.1. In succeeding sections principal rate setting variables at the national level are described. These variables are used to develop a set of national-level environmental scenarios, and national information system options are identified. Finally, scenarios and the options are compared.

An illustrative national system configuration is presented in Appendix C.

4.1 The National Rate Setting Organization and its Functions

In a nationwide Prospective Rate Setting (PRS) system the Federal government is assumed to have an overall responsibility for promulgating policies and standards, monitoring PRS activities, and assessing the quality and impact of PRS. The Rate Setting Agency (RSA) jurisdiction may be a state, a federal region or the entire United States. The collection of individual RSAs, together with the Federal "superstructure" responsible for overall guidance and review of PRS, will be called the national rate setting organization.

The functions of the national rate setting organization are listed in Table 4-I. The primary function, carried out by the individual RSAs, is to set provider rates. These and other RSA functions are summarized in the top part of the table -- they were discussed in more detail in Section 3.1.1. Federal functions are shown in the lower part of Table 4-I.

TABLE 4-I

FUNCTIONS OF THE NATIONAL RATE SETTING ORGANIZATION

I. PRIMARY RSA FUNCTION: RATE SETTING*
   A. Set Provider Rates
   B. Provide Technical Assistance to Providers in Meeting Rate Setting Requirements
   C. Report to Federal Agencies

II. RSA FUNCTIONS* WHICH INTERFACE WITH --
   A. CES Review Agencies
   B. State and Area Planning Agencies
   C. PSROs

III. FEDERAL LEVEL FUNCTIONS
   1. Promulgate Federal policies and standards
   2. Monitor providers for compliance with approved rates
   3. Monitor provider accounting, discharge abstract and billing data for statistical research
   4. Experiment with Rate Setting Methods and Incentives
   5. Evaluate activities of Rate Setting Agencies
   6. Participate in national health planning

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*See Table 3-I for more detail on these functions.

The Federal government would be responsible for promulgating policies and standards relating to PRS. For example, it may decide which methods of PRS are acceptable or may determine the method to be used by individual RSAs.

It would be the function of the Federal government to monitor providers for a variety of purposes. Provider bills could be sampled and subjected to statistical analysis to determine the degree of compliance with approved rates. Provider accounting, discharge abstract and billing data would also be sampled for statistical research on costs, cost trends, case mix, peer group comparisons and related studies. Some of the statistical analysis will undoubtedly involve the development of peer group and regional norms, perhaps in conjunction with planning agencies and PSROs. Further experimentation is needed to clearly establish the feasibility and benefits of different PRS methods and incentive structures: the Federal government will certainly continue its role in this work.

An important function of the cognizant Federal agency would be the evaluation of the activities of individual RSAs. This function involves examining whether rates are set in accordance with Federal policies and regulations and assessing the quality of interactions between RSAs and providers and purchasers.

The rate setting organization would also play an important role in national health planning for the availability, delivery and utilization of health services. Policies, guidelines, and related aspects of health planning influencing the activities of state and regional agencies are promulgated by the Secretary of Health, Education and Welfare, based in part on advice from the National Council on Health Planning and Development.

4.2 Principal Prospective Rate Setting Variables at the National Level

The variables used to construct the set of national viewpoint scenarios are listed in Table 4-II and are discussed below. Other variables which are important to consider when developing the national prospective rate setting information system (PRSIS) are also discussed.

1. Basic Responsibility for Prospective Rate Setting Function

In a national PRS system, basic statutory responsibility for the rate setting function could reside in the Federal government or in the state governments. In the latter case, the state rate setting responsibilities would probably be subject to federal policies and guidelines.

It is necessary to distinguish between the type of government (Federal or state) that has the statutory PRS responsibility, and the level (National, multi-state regional, or state) at which the substantive work of rate setting is performed. This distinction is related to the variable next discussed.

2. Number of Rate Setting Agencies in the National System

The number of RSAs in the national system would depend upon the level at which rate setting is actually carried out.

If the states have the basic responsibility for rate setting, the actual work of rate setting could be conducted by a state agency, an independent commission, or a private contractor such as a Blue Cross Plan. In any case, there would be some 50 RSAs, or perhaps up to 55 or 60 counting the District of Columbia, the Virgin Islands, and possible rate setting subdivisions for populous states like California and New York.

TABLE 4-II
MASTER LIST OF NATIONAL SCENARIO VARIABLES

1. Basic Responsibility for Prospective Rate Setting Function*

    State
    Federal

2. Number of Rate Setting Agencies in the National System

    Some 50 at the State Level
    Some 10 at the Regional Level
    1 at the National Level

3. Variability of Prospective Rate Setting Method

    (among different RSA jurisdictions)

    Variable
    Uniform

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*Implementation of functions may be delegated.

If on the other hand the Federal government has the basic responsibility for rate setting, the actual work of rate setting could be performed by Federal agencies at the (multi-state) regional or the national level -- resulting in ten RSAs or one RSA, respectively. Or it could perhaps be contracted out at the state level (like Medicare administration), resulting in some 50 RSAs.

A more complex arrangement would result if different functional components of the rate setting process were performed at different levels. Thus, for example, under overall Federal responsibility, the more analytical aspects of PRS could be performed at the regional or national level, while the work of interfacing with providers in discussions, negotiations and hearings could be performed at the state (or even substate) level. Such multi-level approaches will not be included in the scenario definitions, but can be considered later if they appear of interest.

3. Variability of Prospective Rate Setting Method

One or more than one PRS method may be employed in the United States, depending upon whether the Federal government legislates a single method to be used by all RSAs, or whether they are allowed partial or complete freedom of choice of method.

If the basic PRS responsibility resides in the state governments, there is a spectrum of possible degrees of federal control, and of consequent uniformity or variability in PRS method, as outlined below:

- The Federal government may require all states to use the same, specified method;
- The Federal government may require all states to use the same, specified method unless a state applies for and is granted an exception; possible

grounds for granting exceptions are the existence or proposal of a PRS method judged by the Federal government to be satisfactory; or

- Each state may choose its own PRS method; this may be purely at the discretion of the state, as is true at the present time, or there may be federally-mandated minimum requirements or specified options (e.g., prototype budget review and formula approaches).

The situation would be much simpler if the Federal government has the basic PRS responsibility -- presumably the PRS method utilized would be uniform throughout the country, regardless of the level at which the work is actually performed.

4. Other Variables

Other variables which make the activities of the national rate setting organization more or less variable are (1) the degree of standardization of provider accounting and reporting, (2) the presence or absence of uniform discharge abstracting and billing, and (3) the degree of uniformity in provider fiscal years.

It is difficult to set rates centrally and make provider comparisons if accounting and reporting are only partially standardized and there is a great diversity of provider fiscal years. Some states have standardized accounting or both accounting and reporting; others have not (see Section 3.1.2). In many states providers may elect their own fiscal years (e.g., Missouri and Kansas); in others, regulations specify a fiscal year to be used by all providers of a certain class (e.g., in Massachusetts the fiscal year begins in October for all hospitals). Statistical research and monitoring activities that require a sample of provider bills will retain their complexity if a greater degree of standardization is not introduced into the billing and reimbursement process.

4.3 Environmental Scenarios at the National Level

Three basic national viewpoint scenarios (with some variation allowed) are shown in Table 4-III, and are labelled K, L and M.

Scenario K represents an environment with maximum variety. PRS is performed at the state level, and each state determines the method of PRS to be used. In some states, rate setting may be delegated to an independent commission or a private body. Since each state determines its method of PRS, a variety of methods is in use.

Scenario L represents a less varied environment than Scenario K. Performance of PRS is still at the state level, but the states choose the method of PRS from among a set of methods specified by the Federal government. In one version of the scenario PRS may be delegated if a state wishes; in the other version this work is performed only by State governments nationwide. The allowed approaches would be designed for a considerable degree of compatibility among RSAs: only a few parameters of the method would be open to choice by the states. One such parameter might be the method of peer grouping; another, the degree of detail used in the analysis; and a third, the types of allowed adjustments in rates.

Scenario M is the most uniform and has a strong federal role. The Federal government has the basic PRS responsibility, and determines the method of PRS to be used by all RSAs. The work of PRS can be done at the national, regional or state level, and may involve a federal or state agency, a commission or a private contractor.

TABLE 4-III

NATIONAL VIEWPOINT SCENARIOS

	SCENARIOS				
Variables	K	L	M		
1. Basic Responsibility for PRS Function	State	State	Federal		
2. Number of RSAs	~50 States	~50 States	~50 States	~10 Regions	1 National Agency
● Delegated?*	Variable by State	Yes/No	Yes	Yes/No	No
3. Variability of PRS Method	Variable	Uniform	← Uniform →		

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*Delegated - i.e., to a lower level of government, a commission or a private contractor.

4.4 National Information System Options

As described in Chapter 2, the PRSIS from the national viewpoint consists generally of a number of RSA subsystems, plus a federal subsystem and perhaps other elements, such as multi-state regional nodes. For two of the three national viewpoint scenarios described in the previous section, PRS is a state responsibility, and is performed at the state level. In the third scenario, it is a federal responsibility, and may be performed at the state, regional or national level. When PRS is performed at the national level, the national system takes on a very special form -- there is only one RSA subsystem, and this is, in effect, an adjunct of the federal subsystem. In all other cases there are many RSAs, probably 10 for regional level PRS performance, and at least 50 for state level performance. For convenience, we shall generally visualize systems for the state level case, but the reader should keep in mind the other possibilities, which will be introduced when appropriate.

Implementation of a national-level information system is, in many ways, a more complex process than implementation of a single RSA subsystem. In the case of the national system, the concepts, design and detailed development depend not only on the national context, but also on the state context. That is, the national system is heavily influenced by the implementation approaches at the state level -- the degree to which rate setting is mandatory, the degree of standardization among states (or regions), etc., as pointed out in the scenarios of the last section. These factors lead to two major options for national system development -- option y, the aggregated design approach and option z, the integrated approach. In the aggregated approach, the national system is designed as an assembly or aggregation of semi-autonomous RSA subsystems tied together through suitable communications capabilities and the federal subsystem. In the integrated approach, however, the national system, and all of its subsystems, are designed as one coherent whole. This means, in effect, that the aggregated approach accommodates itself to the diversity of RSA subsystems in existence at the time of PRSIS implementation; but the integrated approach greatly modifies these subsystems, or actually replaces them with something new.

It should be noted that regardless of whether the design approach is aggregated or integrated, the national PRSIS could be established in a series of phases, with the first phase being either an experimental or pilot system of limited scope, or perhaps a data processing service, which state RSAs could join on a voluntary basis.

To design any complex multi-element system (assumed to be partially automated), one must give major attention to each of a number of critical design areas. Some of these are:

- Data base structures, content and modes of use,
- Data standards, data element definition,
- Security - facility, personnel and equipment,
- Communication paths, message formats, and communications "discipline,"
- Hardware and software requirements,
- Operational principles, including system purging policy, handling of malfunctions, audit trail,
- System documentation and including updating for system changes.

The designer's approach to the resolution of problems in the above areas differs widely between the aggregated and integrated design options. In the integrated approach (option z) the designer can establish principles and standards in all of these areas, with relatively few constraints. In the aggregated approach, the designer is largely governed by the characteristics of all of the constituent subsystems that are already in existence, and that probably have little uniformity among the different states. An extra burden is therefore placed on the design of the Federal subsystem, because its coordination and integration role requires complex interfaces with all the other diverse portions of the system.

In the aggregated approach (option *y*) the national system would probably be built up over a period of time, utilizing or modifying existing facilities, making incremental changes as the environment changes, and being basically reactive rather than directive. Each RSA operation is largely autonomous, operates with only moderate guidance from the national level, and develops its own approach to information support. As time progresses, increasing standardization or uniformity in accounting, reporting, discharge abstracting and billing and in the rate setting methodology will probably be the trend, but for a long period, the national level will have to operate in a complex environment of great variety. Hardware or software development support can be given to state subsystems from the national level by a variety of methods, including demonstration or "pilot" projects. A key characteristic of the aggregated system will be the necessity for a translation capability to convert the variegated state inputs into sufficient uniformity for processing at the national level. Such translation can be carried out, however, only if the accounting concepts and principles, data elements and data structures that each state uses are unambigiously defined.

The integrated mode is defined as the development and implementation of a national system as a single concept and design. It can be installed either as a complete new system, including the RSA subsystems, or as a "capping" system at the national level, but in either case, it implies specification of data definitions and reporting at the state level, uniform procedures, common reporting and communications, and a national system installed as one integrated complex (although installation of the complete system might occur over some extended time). In this mode, the national level can be simplified and optimized since the inputs to the system are uniform and designed to match the system. If the system includes local subsystems, they can be supported with common hardware and software development.

In sum, the aggregated system can be thought of as one that grows from the bottom up over a relatively long period of time while the integrated system is one that is imposed from the top down, with implementation completed in a relatively short time. Both systems have advantages and disadvantages: in general, the aggregated system is easier to implement but could become unwieldy and inefficient; the integrated system demands a comprehensive design, and is politically and technically difficult to implement, but is perhaps more efficient and "cleaner" in the long run.

4.5 Scenario-Option Relationships

In the scenarios introduced in Section 4.3, a spectrum of environments was defined. Denoted by K, L and M, these scenarios are depicted in the upper part of Table 4-IV, which also shows that Scenario M has three variations. In the lower part of the table, Options y and z are listed, and the compatibilities between Scenarios and Options are indicated. The compatible relationships between Scenarios and Options are discussed in more detail below.

In Scenario K, each state has autonomous responsibility for rate setting and the different states do not have uniform methods. In this case, Federal or national level responsibility for rate setting is probably limited to overall policy guidance, procedural recommendations, evaluation, and monitoring to guard against

TABLE 4-IV

NATIONAL VIEWPOINT SCENARIOS MATCHED TO SYSTEM OPTIONS

	SCENARIOS				
Variables	K	L	M		
1. Basic Responsibility for PRS Function	State	State	Federal		
2. Number of RSAs	~50 States	~50 States	~50 States	~10 Regions	1 National Agency
• Delegated?*	Variable by State	Yes/No	Yes	Yes/No	No
3. Variability of PRS Method	Variable	Uniform	← Uniform →		
Options					
y. Aggregated	Compatible	Compatible	--		
z. Integrated	--	Compatible	Compatible**		

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[*] Delegated - i.e., to a lower level of government, a commission or a private contractor.

[**] An integrated system design is appropriate for all three variations of Scenario M.

excess rates applied to federal insurance and public assistance programs. The national system will most probably be an aggregated system, developed over some time to meet the increasing use of rate setting in the states, and provide a measure of nationwide coordination. Federally supported pilot projects and research will continue to promote effective methods and the easing of costs in federal programs.

In Scenario L, the states, while retaining basic PRS responsibility, somehow employ largely uniform procedures with only certain allowed variations. (This may be an unlikely outcome without a large measure of Federal control or pressure, and probably funding as well, leading to a scenario which looks more like M.) For Scenario L, the national level system could be either aggregated or integrated. A possible chronology would be the slow development of an aggregated system which is then replaced by an integrated system as the level of state uniformity and national experience allows the design of a more efficient system.

In Scenario M, the Federal government has basic responsibility for rate setting, which is then performed at the state, regional, or national level. In any case, an integrated national system can be developed since federal control and its imposed uniformity allow such an approach. Rate setting at the regional or national level would be especially compatible with an integrated approach since the number of subsystems involved is so much smaller and the degree of centralized control much higher. It should be noted that local subsystems could be supported by a central hardware/software development and implementation center.

This completes the discussion of scenarios and options from the national viewpoint.

5. HOW RECOMMENDATIONS WILL BE DEVELOPED

Preceding chapters have summarized the nature of Prospective Rate Setting (PRS), defined the overall characteristics of a Prospective Rate Setting Information System (PRSIS), and then discussed the PRSIS from two different points of view: first, the information subsystem that would be required to support a single Rate Setting Agency (RSA), and second, the overall system from a national viewpoint. These chapters identified the major choices or options available to the PRSIS designer, depending upon the technology available for data processing and the probable scenarios representing the PRS environment and the approach taken to the PRS function. (A set of base-line conceptual designs is presented in Appendices B and C.)

The identification of PRSIS alternatives having thus been completed, it seems appropriate to characterize briefly what work will be necessary to develop a set of recommendations, defining both a preferred system design (or several designs), and a suggested program for implementing a pilot or prototype operation. This subsequent work will involve design exercises and studies, various types of analysis, and reviews and workshops involving knowledgeable people who represent providers, bulk purchasers, and rate setting and allied fields. It will involve consideration not only of technical design issues, but also of issues in the policy area, questions concerning results to be achieved relative to cost and time requirements, and questions concerning system implementation. To illustrate the scope of the subsequent work, a selected set of issues and questions is outlined in the next section.

5.1 Issues and Questions

Whereas the previous chapters have emphasized alternative environments in which PRS may be carried out, different approaches to carrying out PRS operations, and technical factors in PRSIS design, a considerably broader viewpoint is required in the subsequent project work. This scope of interest is characterized in Table 5-I by a list of selected issues and questions, classified under the headings of PRS Environment, PRS Operational Concepts and PRSIS Characteristics and Technology. It will be noted that the entries in the table, in addition to being assigned to columns as indicated above, are also organized within each column into four subject fields as follows: policy, design, results relative to costs, and implementation.

Each of the entries in Table 5-I is more completely defined below.

5.1.1 PRS Environment

The issues and problems in this category are very broad and fundamental, and can only partially be addressed by the project studies and analyses. Project results will lead to comparisons or observations that may be useful to those planning PRS-related legislation or procedural regulations. In particular, some of the operational implications of decisions in this area will be determined.

- How much government regulation and decision making is appropriate in the health care field? How much standardization in administrative policies and financial procedures should be imposed by government upon the non-governmental health care provider?

TABLE 5-I

SELECTED ISSUES INFLUENCING DEVELOPMENT OF RECOMMENDATIONS

IMPACT FIELD	PRS ENVIRONMENT	PRS OPERATIONAL CONCEPTS	PRSIS CHARACTERISTICS AND TECHNOLOGY
POLICY	How much govt. regulation, decision making & standardization is appropriate?	What relative weights should be given to various PRS objectives?	What non-PRS functions should PRSIS support? How much clinical data is required?
DESIGN	What is best organizational structure for implementing regulation? What functions should be grouped together?	How can the annual workload cycle for PRS best be scheduled?	How much of PRSIS can usefully be automated considering provider characteristics and data capture costs?
RESULTS RELATIVE TO COSTS	What is relative value of regulation by contrast with other admin. funct.? -- of PRS relative to other regulatory mech.?	What are cost/benefit implications of different PRS options and operational designs; how should resources be distributed?	What are relative benefits to rate setters of different PRSIS designs? What benefits can be given providers?
IMPLEMENTATION	What priority will be established for implementation of PRS relative to other regulatory functions?	How can PRS programs best be implemented considering both technical and organizational factors? How can a climate favorable to PRS implementation be developed?	How can PRSIS implementation best take advantage of D.P. systems currently in use?

- What is the best organizational structure for implementing a given degree and scope of health care regulation? Which functions should be grouped together (i.e., within the responsibilities of a single regulatory body), and which should be kept separate? For example, how can PRS and planning agencies interact most effectively -- by sharing information, by jointly processing rate submissions, or by full merger?
- What is the relative value of regulation by contrast with other administrative activities such as planning, monitoring and financial audit? Within the general scope of regulation, what is the value of PRS relative to other mechanisms such as review of capital expenditures and changes in services, inspection and licensing and review of professional standards? What are the real costs and benefits of major allocations of funds for regulatory purposes? What are the relative cost savings from rate regulation; consolidation of provider services and other planning "outputs"; and streamlining of administrative operation of providers, rate setters, and billing and reimbursement systems?
- What priority will be established for implementation of PRS relative to other regulatory functions? At the national level, for example, what will be the nature of future legislation dealing with health regulation?

5.1.2 PRS Operational Concepts

There are a number of issues to consider in the development of an effective PRS operation. These are closer to the direct target of project studies than are the environmental considerations identified above. Project results may suggest, therefore, some specific answers, as well as useful observations.

- What relative weights should be given to various PRS objectives? As a preliminary to selecting an appropriate PRS approach and operational design, it is necessary to establish the relative importance that will be assigned to such goals as: reducing the unit prices of health care services, providing funds needed for facility improvement, assuring equity among payors and containing the aggregate costs of providers.

- How can the annual workload cycle for PRS best be scheduled? The least costly operation is generally that in which the workload is spread evenly throughout the year. On the other hand, rate submittals most commonly occur in pulses governed by the provider fiscal year (or years). Staggering rate submittals over several months or by quarters would tend to ease this problem, but would make interprovider comparisons quite complicated. Staggering of submittals by provider peer group, however, might be feasible provided such groupings are expected to remain fairly constant from year to year. Since budget years may not be fully controllable by the rate setting agency, however, optimal scheduling of rate setting staff activities is a more likely solution.

- What are the costs and benefits determining the choice of the PRS method on a general level, and of the operational design on a more detailed level? What is the relationship between basis of payment, rate review screens and ceilings, and provision for subsequent rate adjustment on the one hand; and provider incentives to alter their mix of services, administrative practice, operational efficiency, productivity, and departmental costs on the other? How should PRS resources be distributed among the several types of PRS activities? For example, what proportion of PRS resources should be devoted to monitoring providers after rates have been set? What is the relation between monitoring effort and the risk of paying bills containing errors or resulting from fraudulent practice?

- How can PRS programs best be implemented, and how can a climate favorable to PRS implementation be developed despite the many jurisdictional, organizational, and legislative barriers? PRS implementation problems relate not only to developing the technical aspects of the rate setting process, but also to securing adequate rapport with providers and effective provider participation; establishing standards and providing training; conducting public hearings and education programs; and developing an effective PRS organization and staff. The complexities of instituting a fully effective PRS program may require using a phased or evolutionary approach to program implementation. In each phase, care would be taken to assure fully effective operation before the next phase is implemented. Thus, for example, the early emphasis might be on establishing accounting and reporting standards, developing base-line provider cost and classification data, and implementing a very simple screening and review process.

5.1.3 PRSIS Characteristics and Technology

Questions in this category will be addressed directly in the subsequent work of the project, and it is expected that useful answers should be forthcoming.

- What non-PRS functions should the PRSIS support and how broad should be the scope of PRSIS data? The extension of the PRSIS to support functions other than rate setting *per se*, specifically health care planning and processing provider bills and reimbursements, could lead to a different system configuration and possibly even a different technical approach. How much separation of medical from financial data should there be? Potential savings in data processing costs plus the capability to carry out more comprehensive monitoring activities and research studies, may have to be weighed against privacy issues. If clinical data on individual cases is required for rate setting, can it best be obtained from provider bills, discharge abstracts, or other sources?
- How much of the PRSIS can usefully be automated? A basic issue is the degree to which automation is or will be possible and cost effective, and in the extreme, the viability of approaching a paperless system concept. In an automated approach, how can the cost of data capture and conversion to machine readable form best be minimized? What elements of the PRS function other than screening of rate submissions and monitoring of provider actuals are suitable for automation? Furthermore, what is the relation between the degree and distribution of provider automation for accounting and budgeting, and the degree of computerization feasible for the PRSIS? How will very low cost microcomputers affect provider automation?

- What are the relative benefits to the PRS function of different approaches to the PRSIS design? What is the incremental benefit of various special features such as text storage, editing and printout? What benefits can the PRSIS give to providers? The quid pro quo philosophy may well be critical to assuring acceptability of the system. Specific benefits to providers, for example, management reports which show interhospital comparisons by cost center, can be an integral part of the system output. Furthermore, special reports could be provided upon request, consistent with overall system flexibility and operating cost limitations.
- How can the implementation of a new PRSIS best take advantage of data processing systems currently in use? How can a pilot PRSIS developed and tested in one location be replicated easily and economically elsewhere? For automated approaches, the main questions relate to the transferability of reporting standards, data elements and structures, screening approaches and applications software.

5.2 Criteria to be Employed

The questions identified in the previous section -- as well as many other relevant questions not listed -- relate to the framework of scenarios, options and illustrative systems that was described earlier. The questions and the framework will serve to guide the subsequent work of the project, which has as its goal the development of recommendations concerning what type (or types) of PRSIS would be most effective for a given environment, and what program of pilot or test operation should be initiated. This section discusses the criteria that will be used in comparing alternatives and making the necessary evaluations and selections. Section 5.3 discusses methodology.

It must first be recognized that the PRSIS is a support system -- a system that aids or contributes to the function of PRS. Of itself, the PRSIS has little impact on health care cost or administration, except for the negative impact of the personnel and dollars that are expended in the PRSIS development and operation. It is only through the agency of the function supported, in this case PRS, that the PRSIS can be of benefit. It is only through the effective use of PRSIS outputs by rate setters and other personnel, that any desired intervention in health care costs and financing can be achieved. Clearly, therefore, one cannot usefully ask about the cost/benefit relation for the PRSIS itself: rather, the question should first be addressed to the PRS function. Then, for any given approach to PRS, one can ask about the benefit to PRS of information support, and the cost of that support. In view of the indirect nature of PRSIS benefits, much of the subsequent comparison and evaluation will deal with both the PRS function and its PRSIS support.

The criteria that will be utilized in the evaluation of a PRS/PRSIS design alternative are related to the row headings shown previously in Table 5-I, namely: policy, design, benefits in relation to costs, and feasibility of implementation. A brief summary of the criteria follows:

a. Policy

This involves the relation of the design alternative to applicable policies defined by current or expected future statutes and governmental guidelines for health care planning, administration and financing, and more specifically for rate setting and allied functions. Policy will be considered in evaluating a design alternative by examining the extent and nature of the policy changes that would be required to implement the alternative.

b. Design

This concerns the possible operational or technical risks that may be by-products of the design. (For example, the risk of degredation of file data due to human or equipment error.)

c. Benefits

This criterion considers the expected results and benefits, over time, of implementing the design alternative, including both the direct impact of the PRS operations, and the indirect effect of PRSIS. Benefits may be quantitative or qualitative.

d. Costs

Here the focus is on the costs, over time, that would be expended in the development, installation and operation of the design alternative.

e. Implementation

This criterion concerns the relative ease or difficulty of implementing the design from two standpoints:

- Suitability for phased implementation, and
- Likelihood of acceptance by system participants.

As can be seen from the above list, the various criteria involve a combination of qualitative and quantitative considerations. Some of these will be relatively definitive, others more judgmental.

5.3 Design Exercises, Analyses, and Reviews and Workshops

The development of system recommendations will be based upon the results of several kinds of tasks, here designated as Design Exercises, Analyses, and Reviews and Workshops. Each of these is characterized briefly below.

5.3.1 Design Exercises

Volume I and the earlier chapters of this report define a general concept for PRS operations, and for the PRSIS that provides support. In addition, alternative PRS/PRSIS design approaches were outlined in terms of selected values for key variables or parameters, and some illustrative system concepts presented. Concepts were defined from two different viewpoints -- that of the individual RSA, and that of the totality of PRS activities nationwide. Both to provide the basis for subsequent system recommendations, and to furnish data needed in the analyses, and the reviews and workshops, the project will need to convert the concepts into more detailed system designs. Such designs will cover, as necessary, both the PRS operation and the supporting PRSIS.

In characterizing the PRS operation, the design will be concerned with detailing the elements or aspects listed below:

a. The functions carried out, and the steps and procedures utilized,
b. The mechanisms of interaction with provider rates and costs,
c. The labor requirements and operational and other costs involved, as functions of the rate setting workload, and
d. The requirements for information from the PRSIS.

In the design of the PRSIS, five aspects of the system will be emphasized. These are as follows:

a. The several system applications and the general characteristics of each,
b. For each application, the nature and detailed contents of the inputs, associated files, outputs, and other transactions such as queries and responses,
c. A description of the physical system in terms of nodes and branches, and the data handling functions required in each,
d. A choice of data handling elements/equipments or techniques for realizing the functions for the defined applications,
e. The labor requirements, and operational and other costs involved.

The rate setting workload will of course be a variable design parameter.

5.3.2 Analyses

The analyses will complement the design exercises that have been described above. While the design exercises will build or synthesize quantitative or semi-quantitative descriptions of PRS/PRSIS system concepts, the analyses will utilize the descriptions to study possible design tradeoffs, to determine the effects of parameter variation, and to examine the relation between costs and results or benefits. In effect, the system descriptions will be converted to semi-quantitative models, and the models will be manipulated to study questions of interest.

The nature of the models that will be developed, as these are now visualized, is discussed in Appendix D. That appendix also identifies the major financial variables, and how they could be employed, for example, in the selection of PRS/PRSIS parameters.

Initial work with the models and associated financial variables will involve rough calculations to determine which scenarios and options are of greatest interest, and which other variables would be of greatest importance in the subsequent analytical work. Hopefully, this will permit considerable simplification of the models before detailed analyses are made.

Subsequent studies may involve broad questions such as the probable impact of different PRS approaches (basis of payment, type of rate review and nature of incentives and adjustments) on provider costs, or comparison of centralized vs. decentralized approaches to data processing in the national system. Other studies might deal with narrower questions such as the comparison of different methods of data input to the automated part of the PRSIS.

5.3.3 Reviews and Workshops

The purpose of the reviews and workshops is to substantively involve potential PRSIS participants and other knowledgeable persons in the PRS and allied fields in the overall process of PRSIS conception and design. Specifics of these activities will be developed in a later task of the project, but a few remarks are appropriate here.

The workshops are necessary as a check on the requirements for the PRSIS that were described in Volume I, and the family of PRSIS concepts that was described in earlier portions of this report (Volume II). In particular, by exposing project concepts and partial results to group discussions, the opinions of experts in different, but PRS-related, fields can be obtained to help identify any missing elements, broaden perspectives on PRS, and introduce practical experience relative to PRS/PRSIS implementation. The characteristics of the PRS scenarios and PRSIS options can be reviewed, and perhaps modified approaches will be generated for use in subsequent analyses. Without such involvement of potential PRSIS participants, there is little likelihood that a PRSIS design could be successfully implemented.

In a typical workshop as now visualized, the objectives, scope, approach, and tasks of the project will be reviewed, and the overall characteristics of the PRSIS as then visualized will be discussed. Following this introductory presentation, aspects of the PRSIS most relevant to the interests of the workshop members will be discussed. The workshop attendees will then identify their perceived problems and concerns in the PRS area. Next, a detailed "walk-through" of the operation of the PRSIS will be conducted. Finally, all identified issues and problems will be reviewed and discussed.

By contrast with a workshop, a "review" would involve a very small group of people, and would be more informal in structure and content. It would, however, have the same general objectives. The review approach is visualized as a preparation for workshops, and as a way of addressing special topics and problems that are of limited interest or applicability.

APPENDIX A

CHARACTERISTICS AND COSTS OF DATA PROCESSING FUNCTIONS

This Appendix presents selected characteristics and illustrative costs for most of the data processing functions discussed in Section 2.4. The sources for the information in the tables are indicated by footnotes.

List of Tables

A-I Summary of Alternative Equipment Characteristics

A-II Processing Capabilities of Information System Components

A-III Comparison of Information System Component Costs

A-IV Costs of Alternative Transmission Modes

A-V Costs of Service Bureaus

A-VI Approximate Costs for Handling Illustrative Provider Submission

TABLE A-I

Summary of Alternative Equipment Characteristics

FUNCTION/EQUIPMENT	CHARACTERISTICS	PREPROCESSING REQUIREMENTS	ADVANTAGES	DISADVANTAGES
1. Data Input				
Keypunch	Manual keyboard entry to punched cards	Coded or formatted data	Inexpensive equipment; Processor independent	Limited by speed of operator; Low processing speed; Non-revisable cards; Operator limited; Usually converted to machine encoded storage medium
Key to Disc or Tape	Manual keyborad entry to machine-readable medium; Can be pooled and read in larger increments when attached to an intelligent terminal or minicomputer	Less stringent coding requirements than keypunching because may utilize a CRT display, which enables the operator to "fill in the blank"	Editing capabilities while entering data are possible; Faster processing speed than keypunching because mechanical card feeding motion eliminated; Output is machine encoded	More cost effective with larger data volumes; limited by speed of operator
On-line Terminal	Manual keyboard linked directly to processor, with either CRT or typewriter output	Same as key to disc –	Editing, query capabilities; Fast processing.	Not efficient use of processor; Limited by speed of operator.
Optical Character Reader (OCR)	Sensors which scan handwritten or printed material and translate to machine encoded output	Character fonts must be recognizable; Page format must be known to OCR	Processing speed not dependent on human input; Can process very large volumes rapidly	Data input forms must be recognizable; Limited character fonts.
2. Data Transmission				
Mail or Delivery	Conventional mail or delivery systems	None	Low fixed costs	High variable costs; slow
Direct Distance Dialing	Conventional telephone system	Moderate volumes; Digital data	Fast; Low fixed costs; Can handle varying volumes	High variable costs
Wide Area Telephone Service	Prepaid coverage of direct dial calls	Moderate volumes; Digital data	Fast; Can handle multiple nodes, inbound or outbound data selection	Not feasible for varying load periods; Cannot dial both directions
Leased Lines	Dedicated dial-up service	Moderate to large volumes; Digital data	Fast; Can handle large volumes to few nodes; High data quality	Requires large volumes, few nodes; Must condition lines; Inflexible
3. Storage				
Discs		Digital data	Handles large volumes; Direct access capability	Inefficient for small volumes
Tapes		Digital data	Handles small data volumes; Compact	Can be only sequentially accessed
Cards		None	Inexpensive	Bulky; Non-reusable
Microfilm		None	Inexpensive; Compact	Requires special reader
4. Processors				
Large			Can handle multiple users, large volumes, and higher level languages	High investment costs; Requires multiple sharing of use or larg volumes; Requires operations staff
Medium			Less expensive than large; Easier to use as dedicated system	Cannot support as many users
Small			Requires fewer support personnel than larger processors	Cannot program with high level languages nor support many users

Sources: Datapro, The EDP Buyer's Guide, Datapro Research Corporation, Delran, New Jersey, January 1976.
Auerbach Computer Technology Reports, Auerbach Publisher Inc., Cherry Hill, New Jersey, January 1976.

TABLE A-II

PROCESSING CAPABILITIES OF INFORMATION SYSTEM COMPONENTS

	PROCESSING CAPABILITIES
Data Input Equipment	Speed[*]
Keypunch	125 chars/min.
Key to Machine Encoded Medium	100-175 chars/min.
Optical Character Reader (OCR)	600-60,000 chars/min.
Storage Media	Capacity
Disc	1.5 million-112 million characters
Tape	108,000-806,000 bytes/second 200-6,250 bytes/inch 12.5-200 inches/second
Cards	80 or 96 chars/card
Microfilm	10-40 times reduction
Processors	
IBM (large)	65(x10.24)-8,388,608 bytes main memory
DEC PDP11 Series (medium)	16K up
IBM 5100 (small)	16K increments up to 64K bytes
Printers	
	120 or 132 positions/line 40-1800 lines per minute

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[*] Limited by operator, except OCR, for which processing speed is a function of both the mechanical page movement time (relatively slow), and the electronic character reading time (relatively fast), and varies with machine specifications.

Source: Chris Mader with Robert Hagin, _Information Systems: Technology, Economics, Applications_ (Chicago, 1974).

Table A-III

Comparison of Information System Component Costs

COMPONENTS		COST RANGE	
		Purchase	Lease
Data Input Equipment			
Keypunch		$ 3,000 - 5,000	$ 100 - 200/mo
Key to Machine Encoded Medium[1]	1 - 60 stations	3,000 - 5,000/station	80 - 100/mo
		20,000 - 80,000/processor	500 - 2,000/mo
Optical Character Reader		45,000 - 700,000	2,000 - 19,000/mo
Storage Media			
Disc	1 - 9 drives	$ 13,000 - 110,000/controller	5,250/mo
	1 controller	8,000 - /drive	(9 drives)
		200 - /disc	
Tape	depending on number of drives	17,000 - 50,000/drive	
		20/tape	
Processors	large (IBM 370)	$300,000 - 8,400,000	$6,000 - 200,000/mo.
	DEC PDP-11	$ 10,000 - 150,000	
	IBM 5100	$ 9,000 - 12,000	$ about 150/mo
Printers		$ 15,000 - 75,000	$ 600 - 2,000/mo

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[1] Terminals which are on-line are equivalent in price to data entry stations. Cathoderay tubes are generally slightly more expensive than comparable teletypewriter terminals.

Source: Datapro and Auerbach, op.cit.

TABLE A-IV

COSTS[1] OF ALTERNATIVE TRANSMISSION MODES

	Cost			
Nodes	1st Minute	Each Additional	Three Minutes	Capacity
Direct Distance Dialing (8am-5pm)				
Boston - Baltimore	$0.48	$0.33	$1.14	≤27,000 chars. per minute
Boston - Chicago	$0.50	$0.35	$1.20	
Boston - California	$0.56	$0.40	$1.36	
Wide Area Telephone Service (Either inbound or outbound)	Measured (Fixed cost for 1st 10 HRS use, variable for additional use)		Full-Time	
Band 2 (assume Massachusetts)[2]	$190/mo.	+ $14.20/hr.	$850/mo.	≤27,000 chars. per minute
Intrastate (assume Massachusetts)	$ 80/mo.	+ $ 7.00/hr.	$330/mo.	
Band 5 (Massachusetts to/from rest of U. S.)	$255/mo.	+ $19.10/hr.	$1675/mo	
Leased Lines	Rates $/mi/mo.			
Distance (mi)	Half Duplex	Full Duplex		
1-25	3.00	3.30		≤54,000 chars. per minute
26-100	2.10	2.31		
101-250	1.50	1.65		
251-500	1.05	1.55		
501 up	0.75	0.825		

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[1] Costs as of 1 November 1975

[2] Includes Delaware, Washington, D.C., Maine, Maryland, New York (part), Pennsylvania, Virginia, West Virginia.

Source: New England Bell Telephone Company

Table A-V

Costs of Service Bureaus

Program Development	$ 20 - 25/hr	
All inclusive rate	$150 - 200/hr	
Sample Breakout of costs		
non-dedicated machine	$ 650/hr CPU	
	Core K-hr	$ 1.50
	I/O Actuations/1000	
	Disc	5.60
	Tape	5.60
	Terminals	2.00
	Display	10.00
	Printout/1000 lines	$ 2.00
	2 part paper	2.50
	4 part or other	3.50
	Cards/1000	
	read	2.00
	punch	3.50
	Time sharing - connect	$ 5.00/hr
Dedicated machine	$ 450/hr.	
on-line discstorage	4¢/track/day	
Keypunching	$ 40 - 100/1000 cards	

Source: data derived from MITRE Computation Center, rates in force January 1976

TABLE A-VI

APPROXIMATE COSTS FOR HANDLING ILLUSTRATIVE PROVIDER SUBMISSION

Assumed Data Volume: 10,000 entries, averaging 6 char. each

Function	Mode, or Equipment	Speed	Time Required	Pricing Basis	Approx. Total Cost
1. Data Entry	Keypunch	125 char/min.	8 hrs.	$6 per hr.	$48
2. Verification	Verifier	150 char/min.	7 hrs.	$6 per hr.	$42
3. Digital Transmission					
a. Intra-State	Switched Network	100 char./sec.	12 min.	Note (1)	$3 to $4
b. Transcontinental	Switched Network	100 char./sec.	12 min.	Note (1)	$5
4. Printout-Listing of Inputs	High Speed Line Printer	2000 lines per min.	5 min.	Note (2)	$2.50

Note (1) Covers Telephone Service Tariffs Only, not Terminal Equipment. Direct Dialed Calls.
Note (2) $2.50 per 1000 lines, an example of a service bureau rate.

Source: data derived from previous tables

APPENDIX B

APPROACHES TO RSA SUBSYSTEM DESIGN

In this Appendix we will consider approaches to integration of systems supporting rate setting and associated functions. A basic rate setting information system will be characterized and implementation methods outlined. The basic rate setting system will then be expanded in several directions:

- to include support of Planning and CES* Review
- to include support of Provider services and integration of Provider inputs
- to include Billing and Reimbursement support (Purchaser)

Although not exclusive, each of these expansions will be treated more or less independently.

B-1 Basic Stand-Alone Rate Setting System

The functional needs of a rate setting agency have been outlined in Volume I, without distinction of mode of data transmission and storage or location at which functions are performed. In the basic rate setting system, it is assumed that rate setting functions are performed at a state-level agency or at a similar Federal regional agency - the principal difference being in the volume of data to be processed in serving different geographical areas.

Baseline Manual System

In this system, no automation support is provided. Provider information is received in hard copy form using uniform accounting and reporting procedures. All internal processes are manual (with possible calculator use). Reporting to higher levels is by hard copy reports in standardized formats. Data storage is in hard copy library form and in organized files. Data volume is the same as in the semi-automated alternative below.

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* CES = Capital Expenditures and Services

Semi-Automated System

In this system, the rate setting agency is supported by a computer facility that provides:

- initial screening of provider data
- calculation of formulae, peer group averages, trends, etc.
- storage and retrieval of selected data for rapid inquiry
- preparation of *ad hoc* analyses and reports
- preparation of reports to higher levels

Due to the likely variety of automation among the providers, and the other data sources, a multi-mode input capability is included which will accept some set of the following:

- hard copy uniform accounting and reporting inputs
- magnetic tape versions of uniform reports
- on-line inputs direct from providers via wire (communication lines)
- other hard copy inputs

Hard copy inputs can be entered into the system via manual data input stations or Optical Character Readers, the former being more likely and more versatile. These inputs require no automation at the source. The tape and wire inputs assume either automation at the individual provider or the use of a service bureau.

Equipment within the rate setting agency includes CRT display terminals and printers connected to a dedicated computer in-house or to a shared computer facility. Output to higher levels can be by magnetic tape (mail) or by dial-up wire connections (assuming that data volume is not sufficient to support a requirement for direct wire services).

Data storage is a combination of on-line storage (disk type) for the data set of continuing and immediate interest, tape storage (or some other less accessible mode) for detailed data required during batch processing, and hard-copy or microfilm storage for bulk reference data. In all modes of rate setting, a decision must be made as to location and method of data storage based on criteria of cost and timeliness of access. A further distinction may be between data used in the primary rate setting process and detail data used in the "appeal" process when a submission is rejected or challenged by the provider. Another choice is what data is kept at the rate setting agency and what is kept at the provider and made accessible on demand.

B-2 Expansion Toward the Planning and CES Review Functions

The seemingly most likely expansion of a basic rate setting system is toward integration with the health care planning functions and Capital Expenditures and Services review. This integration assumes that (some) planning is done at the same organizational level as the rate setting function.* For example, an integrated system might support a state-level rate setting agency and planning agency. Lower level (intra-state area) planning boards might receive computer support from the same facility, however. Integration with the planning and CES review functions suggests three prime benefits:

- use of a common data base: much of the data used by the functions is the same data, and a commonly held data base would appear to be both feasible and efficient. In particular, common data includes:

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* The health care planning agencies, being established in accordance with P. L. 93-641, were described in Volume I.

    - provider facilities, costs, statistics
    - CES proposals
    - economic and demographic data
    - purchaser and enrollee statistics and projections
    - patient population data
    - interstate averages and norms
    - Federal policies, regulations, etc.
- use of a common computer facility for support in computation, answering queries, and preparing reports
- use of common staff specialists (where needs for specialized professionals overlap).

Rate setting, planning and CES review have dynamic characteristics that make them especially suitable for integration. In some states rate setting (in several likely modes) will possibly be done on a "seasonal" basis, with a high load at some point in the fiscal year, and possibly at quarterly monitoring points. CES review activities depend in large part on the timing of provider submissions, which tend to be scattered. Much of planning work has a more flexible schedule, and presumably could be arranged to minimize activity during periods of high rate setting activity. With suitable mutual accommodation, the computer capability and staff time could be utilized effectively with a smoothing of peak load requirements.

The benefits of integration in this expansion do not actually require that the functions all be done in the same organizational entity. An alternate configuration would be to have separate agencies share the computer facility and perhaps some staff specialist support, leaving the decision makers clearly in separate agencies if required for political reasons. As mentioned above, lower regional boards or other agencies could be supported by the same computer facility and staff consultants, perhaps with remote terminal access to the state computer center.

This expansion will work equally well at the federal regional level; however, it seems less likely that detailed planning (and CES review) will be done at that level. If rate setting is at the federal regional level, however, then an integrated facility could support whatever federal planning review is done at that level.

B-3 Expansion Toward the Provider

The bulk of the information submitted to the rate setting function comes from the providers and close relationships between provider and rate setting agency must be established for detailed reviews, negotiations, and certain other activities. Nevertheless, the relationship between providers and rate setters is basically an adversary one. Despite this mixed climate, expansion of the basic system toward integration with providers is worthy of consideration. An additional motivation is that provider accounting and other functions related to rates, billing, and reimbursement are a large expense in the total health care cost. Any method of operations which could make a significant dent in that cost might be attractive. On the opposite side of the coin, however, is the difficulty of integrating one rate setting agency with several hundred providers (as opposed to one planning agency).

Conceptually, the simplest, and possibly most likely, approach is to consider a "provider service bureau" integrated with the rate setting function. In such a configuration, providers would input basic accounting, patient records, budgeting, billing, and other financially related data into the service bureau which would provide accounting, budgeting and billing service and would also maintain hospital utilization statistics. The service bureau would then accumulate and process such data into the required form for rate setting (and planning, if integrated). The service bureau data base would be selectively available to the rate setting agency as specified by aggreement with the provider.

This expansion must be studied in more detail both as to feasibility and cost/benefits; however, several benefits are apparent:

- the large volume of data and processing required for provider service would allow implementation of a computer facility large enough to support rate setting functions with ease and with marginal additional cost,
- a shared service bureau/rate setting data base would obviate the need for high-volume data transfer between provider and rate setting agency and would tend to minimize difficulties in obtaining timely rate setting data in proper format,
- although provider acceptance of such close integration of service bureau and rate setting may well be a considerable initial hurdle, once overcome, such a system could lead to more "openness" between provider and rate setter.

This alternative, like the planning expansion, does not necessarily require that the service bureau and the rate setting function be organizationally in the same entity. Much of the benefit would be derived from sharing a computer facility and a data base.

B-4 Expansion Toward the Purchaser (Billing and Reimbursement)

Another possible direction for expansion of the rate setting information system is toward the billing and reimbursement functions of the bulk purchaser (i.e. the processing of bills received from providers, and the making of reimbursements to providers). This case is similar to moving toward the provider in that a computing capability necessary for the volume requirements of handling most billing and reimbursement service is large enough to support rate setting at minimal marginal cost. In addition the data flowing through the billing and reimbursement functions allow rate setting to:

- monitor the application of rates by the provider and check that proper rates are in use,
- monitor the revenue flow to the provider as a check on actuals,

- use detailed charge data in billing to accumulate statistics on provider services.

Integration of billing and reimbursement with rate setting is obviously heavily dependent on the method of payment, being most useful in a detailed charge or payment by diagnosis method and less useful in per diem, per capita, or per admission systems. Budget allocation payment is so limited as to require separate treatment since the reimbursement method is simply enough to make "integration" somewhat meaningless and negate the demand for a large computing capability for billing and reimbursement as indicated above. In this case, however, data used for payment and for rate setting is the same.

Staff services do not overlap much between purchaser and rate setting functions, and conflict-of-interest situations may apply (depending on the type of purchaser). Integration under these constraints might be largely in the sharing of computer facilities and an overlapping data base.

Benefits:
- large computer facility available with continuous load due to billing and reimbursement requirements
- easy access to billing and reimbursement data for rate setting monitoring.

B-5 Use of Common Data Bases

As discussed above, it is feasible (and economic in some configurations) to integrate various functions of rate setting, planning, purchasing and provider support. This section expands on the data base implications of such integration.

Table B-I is a gross summary indicating the major categories of data utilized by the four primary participants, and how these categories overlap. Greatest functional overlap is between rate setting and planning. The greatest volume of overlapping data

Table B-I

Data Base Commonality

Source/Data	Provider	Purchaser	Rate Setting	Planning
Provider				
Accounts Payable	X			
Patient Records	X	X(partial)		
Bills	X	X	X(monitor)	
Patient Abstracts	X		X	(X)
Actuals	X		X	
Budget	X		X	(X)
Facilities (Characteristics)	X		X	X
Capital Plans/Funding	X		X	X
Utilization (Statistics)	X		X	X
Purchaser				
Payment (Reimbursement)	X	X	X(monitor)	
Accounts Receivable		X		
Envoice Records		X		
Payment Rules	X	X	(X)	
Enrollee Statistics		X	X	X
Rate Setting				
Policy & Rules	X	X	X	(X)
Interstate Rate Data	(X)	(X)	X	(X)
Provider Historical Data			X	
Peer Group Averages			X	X
Provider Trends			X	X
Econometrics			X	X
Planning				
Demographics			X	X
Health Care Statistics			X	X
Community Plans				X
Capital Expenditure Trends				X
Funding Policy/Projections				X
Demand Projections				X

(i.e., requiring communication between functions if data is not shared) is probably between provider and purchaser (in most methods of billing and reimbursement). Figure B-1 expands the data base and processing functions of each participant into a gross information system model showing:

- Files
- Processing modules
- Inputs
- Outputs

communications between functions

This model will serve as the basis for future detailed integration concepts in which specific data files will be shared and inputs or outputs eliminated through data sharing in a common facility.

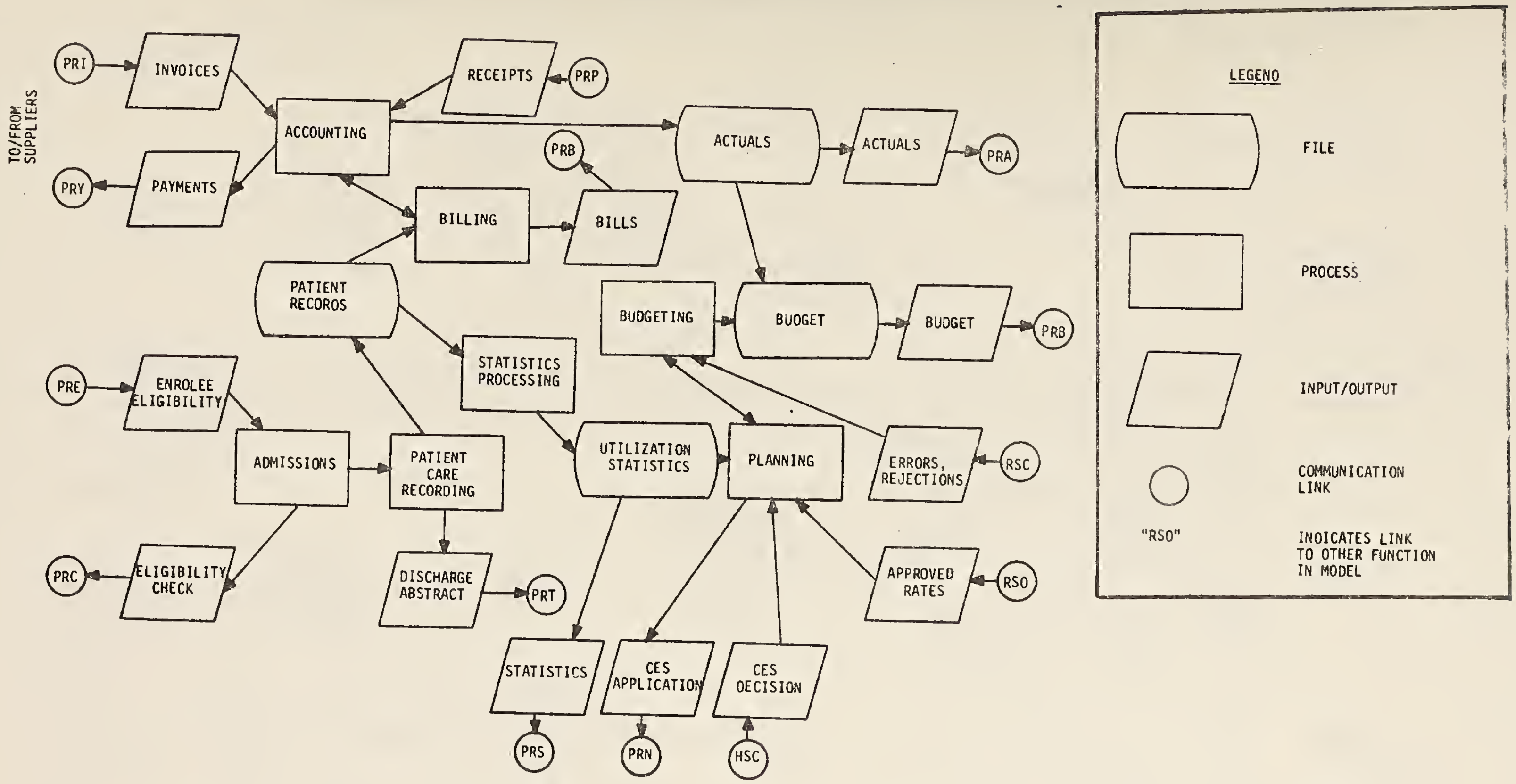


Figure B-1 (a) Provider Information System Model

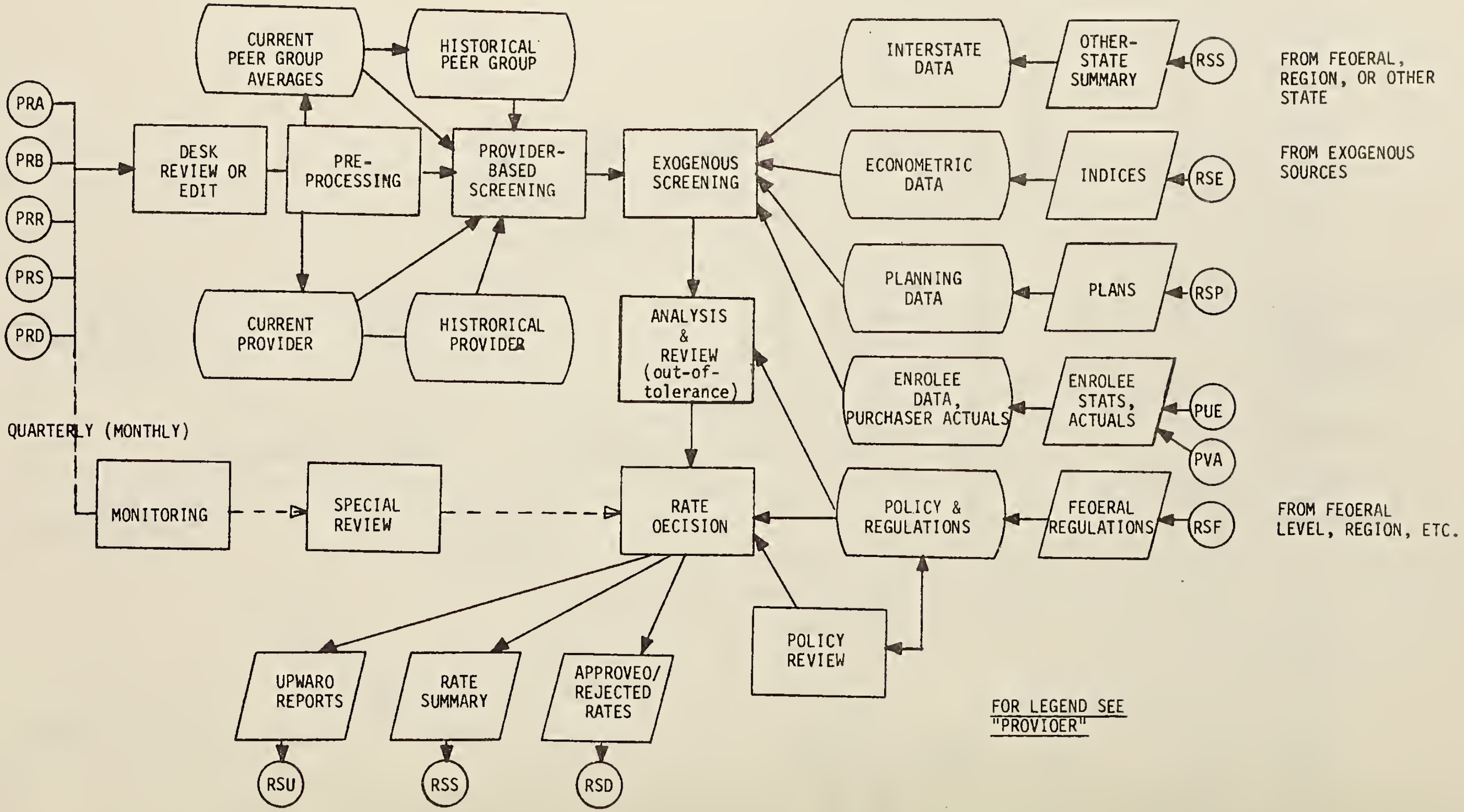
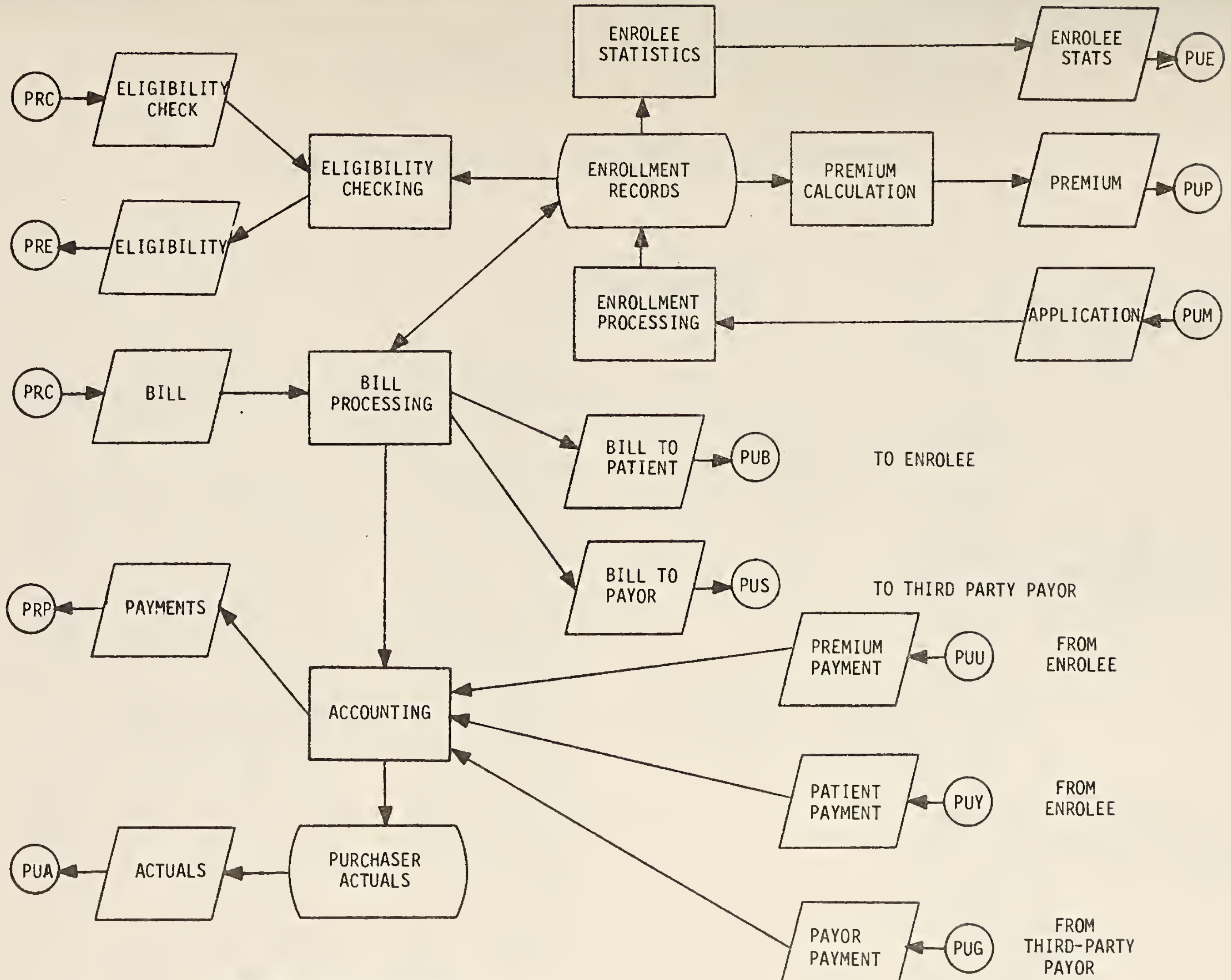
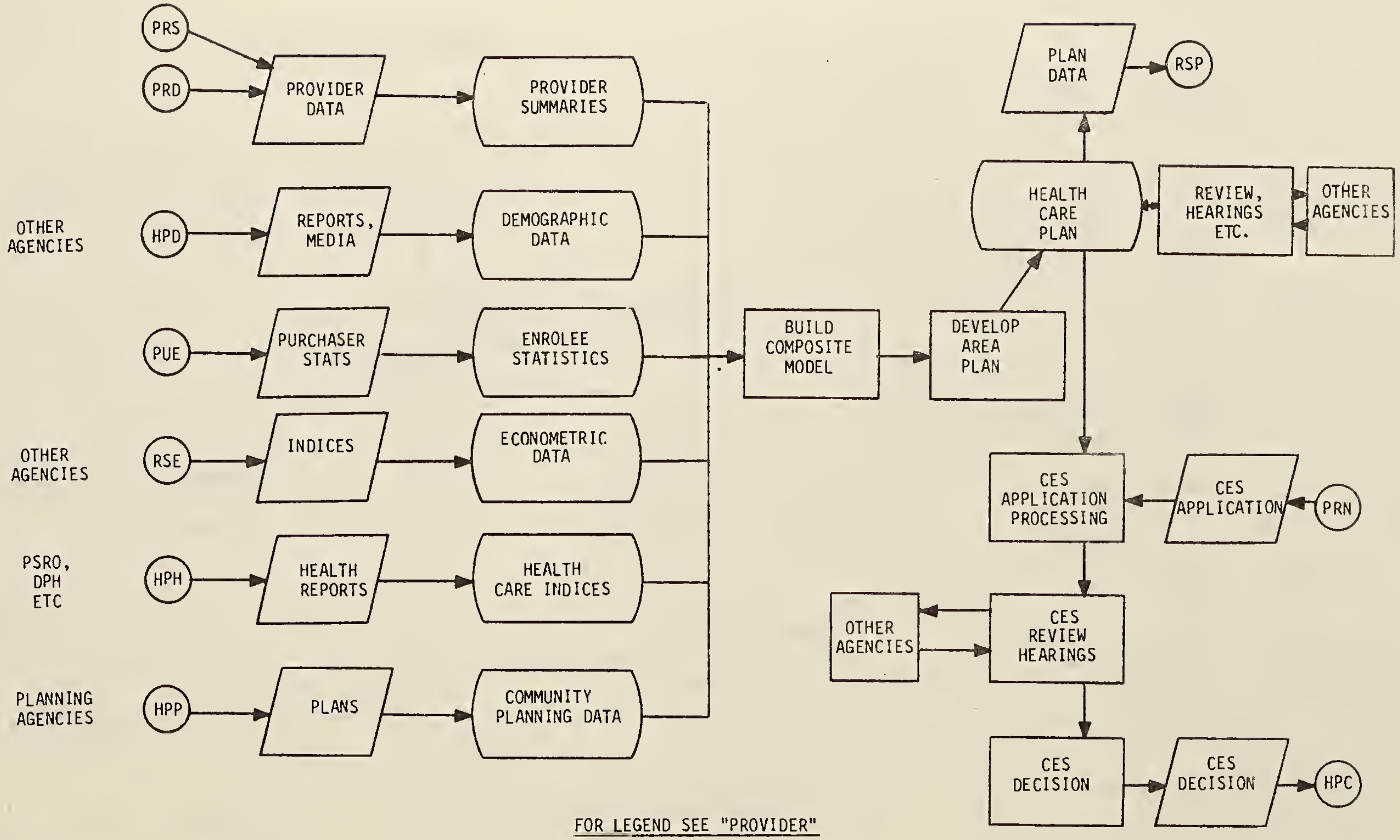


Figure B-1 (b) Rate Setting Information System Model



FOR LEGEND SEE "PROVIDER"

Figure B-1 (c) Purchaser Information System Model



FOR LEGEND SEE "PROVIDER"

Figure B-1 (d) Planning Information System Model

APPENDIX C

ILLUSTRATIVE CONFIGURATIONS

This appendix presents, for illustrative purposes, a set of baseline configurations of PRSIS which might result from the environmental scenarios and design options described in Chapters 3 and 4. These configurations show some of the organizational and technical solutions that are possible.

There are four baseline configurations:

1. "Present System"
2. State-level RSA Variations
3. Regional RSA
4. National RSA

Note: to add verisimilitude to these configurations, reference is made to "Blue Cross","NHI", "HCDC", etc. It should be clear that these references to specific real or imaginary agencies are assumptions for illustrative purposes only and are not in any sense recommendations or factual statements.

C-1 Present System

This configuration is characterized by complexity at every level and by a great variety of hierarchical organizations in different purchaser systems. The PRSIS must be flexible enough to match this variation. The complex of existing systems probably recludes highly integrated PRSIS modes and limits the degree to which integrated PRSIS design can cause large-scale cost or performance benefits in terms of the overall health care system.

Major Variables

The variables with the most impact on PRSIS are:

- Complexity of plans/purchasers
- Existing systems projecting into future
- Retention of functions at State level

Billing and Reimbursement

Because of the complex of plans/purchasers, equitable billing requires some version of detailed charges. Reimbursement is by various modes, tailored to individual purchaser-provider relationships. With such a variety of methods and participants, the difficulty of integrating billing and reimbursement into the PRSIS probably outweighs the benefits.

Billing: a. Primarily detailed charges for services rendered, exact mode may vary with purchaser.

b. Considerable direct billing to patient for uninsured parties, coinsurance and deductibles.

Reimbursement: Payment by individual bill, or in various bulk payments depending on purchaser.

Provider: Must service detailed bills in many forms to a multitude of purchasers.

PRSIS: No integration of billing and reimbursement into PRSIS.

Rate Setting and Planning/CES Review*

Since this configuration places the bulk of the health care "administration" at the state level, rate setting and planning can be integrated effectively. Rate setting is based on detailed charges and therefore on detailed budget review. Most of the required data base is shared with the planning (and CES) functions and these are supported by an integrated PRSIS facility.

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*CES = Capital Expenditure & Services

Provider: Prepares uniform accounts and budget reporting, sends hard-copy reports to RSA annually with quarterly submission of actuals and CES requests to state planning agency (via local area planning agency or HSA)

Purchaser: Annual submission of enrollee statistics and projections. May supply billing samples or other data for monitoring by RSA.

Federal Monitoring: Each state has different rules (coverage, coinsurance, etc.) for eligibility and payment. PRSIS support at the Federal level must allow for a variety of state inputs with increased complexity of data storage and processing.

PRSIS

Separate rate setting and planning agencies are served by the same information system and hardware facility. The bulk of the inputs into the system are in manual hard-copy form. Some large providers and many (or all) purchasers provide data in machine-readable form, principally magnetic tape. An input facility can accept tape or convert hard-copy to tape (cassette, disk, etc.) by use of keyboard input situations. Optical character recognition - OCR - input is a possibility but requires increased standardization of input format and type font. Considering the need, in the integrated RSA planning facility, of inputing a wide variety of material from various sources, a flexible manual conversion mode will be necessary in any case. OCR could be provided by use of a commercial service bureau if proven desirable.

Provider data is stored in two modes - selected budget data and actuals (perhaps 10-20% of the total) are converted to computer input and all data is stored as hard copy (or microfilm). Complete conversion to computer storage is impractical at the volume of data (300,000-500,000 characters) involved in a detailed budget submission.

The PRSIS facility in a model state (200+ hospitals) is estimated to be on the order of a large minicomputer with several hundred million bytes of disk storage (for on-line processing), and several tape units. An input conversion section has 4-6 key-to-disc stations and an equal number of inquiry response stations (keyboard/CRT/printer) are available to rate setters and planners (located in the agencies at functionally convenient points).

The PRSIS computer does a screening process on provider submissions, isolating and displaying out-of-tolerance items. In addition a series of pre-programmed or *ad hoc* displays or reports can be obtained on demand through the inquiry stations.

Variable state regulations prevent nationwide standardization of PRSIS facilities.

National System

Federal rate setting functions are limited to policy and monitoring of rates for Federal insurance programs and research/development activities. Non-uniformity among states makes direct support (hardware or software development) difficult.

C-2 State-level RSA Variations

One of the most likely configurations for rate setting administration is that of performance at the state level, with state responsibility or with Federal responsibility (less likely). In Scenarios A-E, and the state-level version of F, (Chapter 3), the RSA is at the state level, with various degrees of mandatory rate setting, standardized accounting and reporting, standardized billing, and simplified bases of payment. As these scenarios move from A to F, the environment becomes less complex and the degree to which the environment can be controlled to meet rate setting needs increases. Considerable variation in configuration is possible within any of these scenarios; this configuration discussion will attempt to indicate some of the more interesting options.

Major Variables

- degree of integration at state level with planning, purchasing, providers
- degree of standardization of billing, accounting, etc.
- existing facilities, service bureaus, insurance processors
- rate setting methodology (level of detail)

Billing and Reimbursement

As billing becomes standardized and the number of purchasers diminishes, the processing support required for billing and reimbursement obviously lessens. In parallel, it may become more useful to incorporate billing and reimbursement with the rate setting function. As long as there are multiple purchasers, there is a need for an "equity" method of payment; as soon as the number is reduced to one (National Health Insurance only) then simpler, non-equity methods can be used.

Rate Setting and Planning/CES Review

In scenarios having multiple purchasers, and "equity" methods of payment, some combination of formula and detailed budget review is likely in the rate setting process. In the single purchaser case, where equity payment is no longer necessary, a gross budget review can be used. In that case, budgets can be limited to summary cost center data and cost-finding is no longer necessary, since whatever payment method is used (per diem, per admission, regular budget allocation) is simply a means of paying the total budget on a pro-rated basis. It is assumed in this configuration that rate setting is mandatory for all providers and that a major planning function is performed at the state level.

PRSIS

Rate setting information support in this configuration is shown in three variations based on:

- size (volume) of rate setting processing as a result of volume/level of detail relationships in the rate setting process
- degree of integration with other functions
- sharing of facilities

These variations are characterized as follows:

- a simple RSA supported by a health planning agency information system
- the RSA is part of an integrated state-level system supporting all health care administration
- RSA support is provided by a purchaser (e.g., Blue Cross or other insurer) information system

Health Planning Agency Support System

Data requirements for rate setting are greatly diminished by a "rates only" method, simple formula, or gross budget review.

Integration with planning is more in the nature of the RSA receiving some data base and processing support from the planning agency, particularly for exogenous data. Benefits of integration are diminished and RSA could operate independently with minimal or no automation other than simple arithmetic support. Purchasers perform rate monitoring and report-by-exception to RSA.

Data is received from the provider in hard copy form and is entered into planning agency computer for statistical processing. One terminal (inquiry station) is located in the RSA area for ad hoc inquiries. Regular reports are prepared in hard copy (batch) and delivered to RSA rate setting analysts. Purchasers report results of rate monitoring in hard copy quarterly.

State Health Care Data Center System

Detailed budget review demands a large staff for rate setting and increased data input and data storage. Since all functions are performed in state agencies, a total integration of billing/reimbursement/rate setting/enrollment/planning is possible. In such a system, the provider might submit only quarterly actuals (in detail by department) and statistics for both billing and reimbursement and rate setting. Planning and other facility-related data could be made in an annual submission or as required. Per admission rates could be computed quarterly (or monthly) in a continuous running check on revenue vs. costs vs. services provided.

PRSIS is maintained by a state Health Care Data Center (HCDC) which receives monthly cost/service reports from the provider and provides the following services:

- Monthly reimbursement
- Monthly check on revenue vs. budget
- Monthly check on costs vs. budget

- Running account of actuals vs. budget
- Peer group averages and trends
- Economic indicators
- Adjustments to rates

Reimbursement, rate setting and planning are performed by independent branches of the State DPH or the DHEW, subject to review by a Health Care Review Board. PSRO activities are independent but could also be given data processing support by the HCDC.

Provider accounting and budgeting is also supported by the HCDC for participating providers. In effect, a large shared data base of provider cost/revenue data is created in the HCDC for use, under security and privacy controls, by health care agencies.

The HCDC will be a large-scale computer facility servicing terminals in each provider (smaller providers may share a terminal at a large facility) with direct wire or dial-up communications (depending on the volume of traffic). Terminals will serve both volume input and query-response capabilities.

Data storage requirements will be very large, however most transactions do not require rapid response time. Bulk storage will be by magnetic tape or on-line mass storage with transfer to disk while servicing terminals in an inquiry mode.

Purchaser Support System

Here is it assumed that Blue Cross/Blue Shield is retained to act as the single insurer/intermediary in each state; under varying state rules for eligibility and coverage. Whatever coinsurance, deductibles, etc. that must be collected from the patient or sources other than the government are processed by Blue Cross. Blue Cross maintains PRSIS as an integrated billing/reimbursement/rate setting/planning enrollment support system. Blue Cross does not perform all these functions but it provides a processing and data storage facility in support of all functions. The PRSIS facility is a large computer with extensive disk storage and tape units supporting on-line storage of provider gross budget, actuals, and statistics, and exogenous data. PRSIS can provide "hospital service bureau" support to providers who choose to participate.

National System

In the state-level configurations the responsibility of the Federal government, and the national-level rate setting system, can vary from limited policy-making and monitoring to direct responsibility (as in Scenario F). In the scenarios with less uniformity among states it will be difficult for the national level system to have a direct impact on state systems. As the states become more uniform, and standardization increases, increased national support of hardware and software, processing standards, etc. is possible. In the last case, Scenario F, the Federal government has total responsibility for rate setting and would prescribe methods and standards as well as supplying centralized support.

In all state level variations, some communication with the national system will be necessary, the exact volume and type of traffic depending on the level of national participation. Any of the PRSIS systems discussed could use mailed magnetic tape, dial-up wire, or dedicated wire for transmission of data to the national level. In fact, all three methods may be used simultaneously by different states with widely varying traffic volumes. A two-way dial-up inquiry capability may be useful to query national level and interstate records from the state and to obtain detail from state records at the national level.

C-3 Regional RSA

This configuration marks a shift to all-federal administration of health insurance programs with the total elimination of state-level participation except in the PSRO and Planning roles. It assumes the enactment of National Health Insurance (NHI). Planning and PSRO could be shifted to the federal regional level but this seems unlikely given the state level planning structure that will already exist and the need for "neighborhood" inputs to the planning process. Purchasing is done through private insurer/intermediaries who can carry private insurance as well as process NHI claims. The provider deals with only one purchaser, who then receives payment either from the government (NHI) or from private insurer, patient, employer, etc. Federal aspects of the program are administered at a multi-state regional office with policy making and monitoring at the national level. The NHI plan is uniform across the county.

Major Variables

- divorce from state functions
- commonality/uniformity
- limited size variations

Billing and Reimbursement

In order to provide equity between NHI and private payers, billing is on a standardized detailed charges basis, with the provider transmitting a detailed bill on each case to the purchaser. This may be done, however, on a monthly or other regular basis with bulk reimbursement for the period by the single purchaser.

Rate Setting

Rate setting is based on gross budget review (cost and revenue data per revenue department) using an annual budget submission and quarterly actuals reporting. Rate setting is performed at the NHI regional office.

Planning/CES Review

Planning remains at the state level and is no longer integrated with rate setting. Data on CES requests and other long-range planning factors will be sent to the NHI Regional Office from each state planning agency. The state agency and regional office will coordinate all data in common use in both systems to insure consistent planning and rate setting.

PRSIS

The existing Blue Cross/Blue Shield systems act as intermediaries for NHI and as the only private insurer (or will consort with commercial carriers in a coordinated program). Billing and reimbursement and other purchaser functions do not necessarily have to be at the state level but could cross state boundaries, however existing structures may limit such consolidation. The BC* system will maintain a billing, reimbursement and enrollment data processing facility which will support provider accounting, budgeting, and billing as well as purchaser functions.

Each purchaser will have direct wire (or dial-up) connection to the NHI Regional Data Center computer facility which will support rate setting and purchaser monitoring. Gross budget information for each provider will be transmitted via the BC purchaser system. Monthly reports of provider activity (statistics), costs, billing (revenues) and purchaser summary data will be transmitted to the regional office on a staggered basis to smooth the data processing load. State planning data centers may have a dial-up connection to access data storage at the regional center for provider and purchaser data.

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*BC - Blue Cross

Each regional center will be connected via dial-up or dedicated wire to the national center for monitoring and exchange of inter-state and inter-regional data. Regional centers will have a large mini-, or medium scale, computer with manual input stations for exogenous and other data inputs and mega-byte storage for provider and purchaser data. Storage limited to gross budget information will not, however, require a mass storage capability.

National System

In this configuration, the Federal government has responsibility for rate setting and the national system can be tightly integrated with the regional centers. The national system could provide:

- centralized hardware and software development and maintenance with a minimum capability at regional level
- batch processing for the regional centers
- common data base storage
- back-up support

The national system will include a high level of monitoring, inter- and intra-regional comparisons, auditing, and preparation of indices, average, etc.

C-4 Centralized RSA at the National Level

This configuration although an unlikely one, is included to investigate the characteristics of a highly centralized, simplified plan. The RSA and national viewpoints coalesce. National Health Insurance has been enacted, and is all-inclusive. All government-paid programs are subsumed as are Blue Cross and private plans (if remaining, they are integrated into NHI so as to appear as a monolithic structure). All citizens are eligible for NHI coverage. Providers deal only with a national NHI agency, as do enrollees (i.e., the national NHI agency is the only purchaser). Equitable billing is unnecessary since all payments are from one source. Eligibility checking is based on card identification and any deductible or coinsurance is processed by the NHI agency. Reimbursement can be on any basis which meets the providers needs best - budget allocation has been chosen as the simplest mode (per diem, per admission or per capita-admitted could have been chosen as functionally similar). Rate setting is moved to the national level, in the NHI agency, or in a separate agency supported by the same data processing facility.

Major Variables

- degree of centralization
- size of the RSA jurisdiction
- extent of consolidation of RS with other national level functions

Billing and Reimbursement

This configuration is actually very similar to C-3 except that the provider deals directly with a national agency. Wich such long communications and centralized processing, billing data transmission should be minimized. A budget allocation method allows a minimum data requirement wherein the provider transmits monthly or quarterly actuals to be compared with the annual budget submission, and the purchaser (NHI agency) makes regular monthly or quarterly payments based on the actuals. Uncontrollable changes in admission volume or case mix will require adjustments, which can be made on a quarterly basis. This system is characterized by minimum data requirements combined with continuous monitoring and adjustment. Providers may be serviced by a federally-sponsored but provider-financed "service bureau" which supports provider accounting and provides automated (or tape) communication with the NHI agency.

Rate Setting

This configuration is essentially like C-3 but at the national rather than regional level. Consolidation of all rate setting at the national level, with the obvious massive requirements for data processing and storage, might demand a shift to some "continuous" form of rate setting combined with continuous monitoring. The annual submission of budgets could either be staggered or replaced by a "running budget" system wherein the budget projection could be periodically modified as required. In effect, the rate setting/reimbursement becomes one of paying the actual costs of the last period, comparing those same costs against past costs, trend estimates, peer groups and exogenous trends, and placing penalties or constraints on costs for the next period. This could be a largely automated process with human review by exception.

Planning/CES Review

This is like C-3 at the state level by state agencies. A national data base at the NHI/rate setting agency is available through dial-up wire to terminals at each state planning agency that cares to participate.

PRSIS

In this scenario, billing, reimbursement, and rate setting are intimately connected and are essentially the same system. A large scale computer facility with mass storage capability is required to support a centralized national level operation. To offset the cost of such a facility, the need for local support is minimized by the simplicity of the billing and reimbursement process and the elimination of many provider-purchaser interactions such as eligibility checking.

A dial-up wire network connects providers (or service bureaus) and state agencies with the national data processing center, providing both automated reporting and an inquiry capability to support planning and provider management. NHI staff have programmed an *ad hoc* inquiry capability at CRT terminals and batch job stations.

Although the basic system is centralized, interaction with enrollees and providers will probably require a regional or state office to process inquiries, errors and other miscellaneous tasks requiring direct contact. These offices would also serve as data input stations in lieu of the service bureaus.

APPENDIX D

QUANTITATIVE MODELS AND FINANCIAL VARIABLES

This appendix supplements the discussion of analyses in Section 5.3.2 by describing the nature of the models that will be developed to carry out these analyses, and by identifying the major financial variables and their relationship to the selection of PRS/PRSIS parameters.

D-1 Quantitative Models

It is anticipated that there will be six models of portions of the health care system that are relevant to PRS for institutional providers such as hospitals and nursing homes. These models portray in analytical terms the following elements:

a. The information system - PRSIS
b. The rate setting function - PRS - that the information system supports
c. The bulk purchasing function
d. The institutional health care providers
e. Other health care planning and regulatory functions
f. The health care consumer

Of these six models, the first four are the most complex. Figure D-1 shows the models (some of their characteristics) and how they interact with each other. Table D-I enumerates model characteristics.

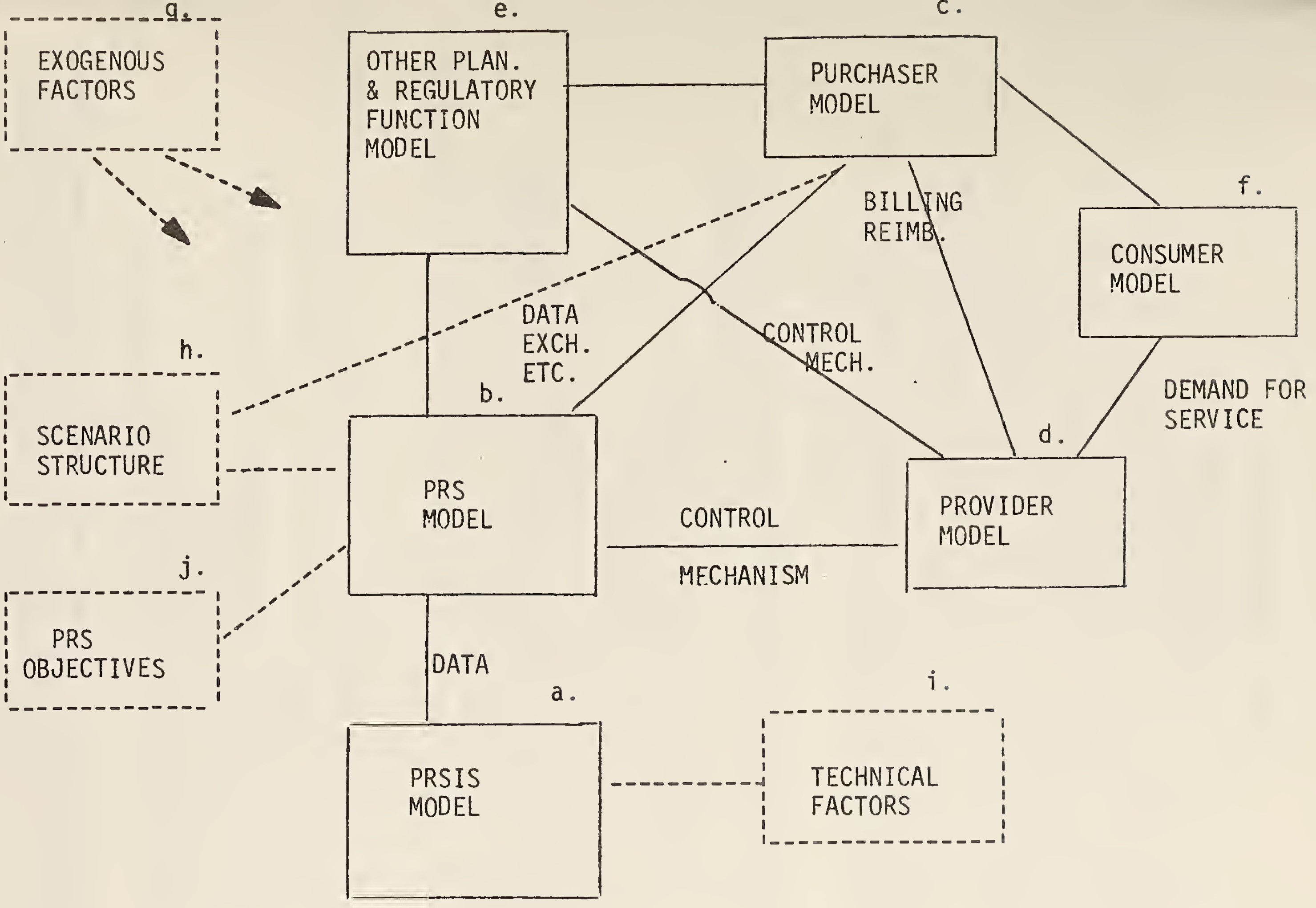

Figure D-1 Analytical Framework

TABLE D-I

DETAILS OF MODELS

a. The PRSIS Model is characterized by such general characteristics and specific variables as the following:

- Functions supported, including coupling (if any) with planning and billing/reimbursement
- Source of inputs, and recipients of outputs
- Network topology, including numbers and locations of nodes
- Functions at each node, data sent through each branch
- System inputs and outputs -- volumes and scheduling
- File volumes
- Technology utilized for each function performed in each class of node and branch
- Cost factors for each data processing function

b. The PRS Model has the following elements:

- Level where PRS is carried out; who is responsible
- Kind of PRS review of rate submissions
- Type of cost and productivity screens
- Basis of provider reimbursement
- Nature of provider monitoring
- How rates are stated (e.g., basis of charge)
- Nature of incentives and subsequent rate adjustments (if allowed)
- Data required for PRS
- Results achieved by PRS
- Cost factors for each PRS function performed, and dependence on the number of providers

c. The Bulk Purchaser Model would be based upon the factors listed belo

- Number and identification of Bulk Purchasers, and Purchaser plans
- Who does provider reimbursement; relation to PRS
- Who keeps basic enrollee files
- Measure of extent of coverage
- Number of distinct enrollee groups
- Cost factors for bulk purchaser administration

d. The Provider Model would be a relatively simple representation of providers from the "outside", rather than a detailed operational model of the internal workings of a provider; it would, however, involve the following variables:

- continued -

TABLE D-I (concluded)

- Classification (hospital or nursing home; type)
- Average length of stay
- Type and scope of services
- Case mix by diagnosis (simple summary characterization only)
- Gross utilization statistics, including average occupancy and admission rate
- Staffing intensity factors; labor fraction of total operating expense
- Some index of outcomes
- Cost factors, four major service types; fixed and variable components; provider distributions by cost level
- Degree of present use of automation for accounting, budgeting and billing

e. The Other Planning and Regulatory Function Model would characterize overall the impact of these functions on PRSIS, PRS and Provider Model variables, such as:

- Functions supported by PRSIS, data supplied
- Data contributed to PRS/PRSIS
- Impact on selected provider costs

f. Lastly, the Consumer Model would have health care attitudes and expectations as qualitative characteristics, and demand by diagnosis by type of NHI enrollee and number of enrollees by type as quantitative measures.

In general terms each of the four main models (a, b, c, d) describes the activities carried out, the workload or intensity of activity, the results produced, the resources utilized, and the cost.

Note as shown in Figure D-I that the data outputs of the PRSIS constitute one of the inputs of the PRS function, and that the results of PRS influence the provider activities/finances through a specific control mechanism. This will tie together analytically some of the result variables of the PRS model with rate and other variables of the Provider Model.

Some of the other interactions between models are:

- Consumer-Provider: demand for service by diagnosis
- Bulk Purchaser (and Consumer)-Provider: billing and reimbursement
- Other Functions-Provider: control mechanisms
- Other Functions-PRS: data exchange and sharing and other interactions

The details of the models and how they will be used analytically will be developed subsequently, and documented in later reports. One comment, however, is required here on the way in which the set of models will be employed. In any given modelling exercise, the overall system (or rate setting unit subsystem) will be visualized from a given point of view and level of aggregation. Thus, one can analyze relationships from the viewpoint of the individual provider, or of the rate setting jurisdiction, or of the total national system. When modelling at the rate setting, jurisdictional level, for example, one would need to aggregate the provider model over all providers in that jurisdiction -- provider variables would then become frequency distributions. Similarly, modelling at the national level would require nationwide aggregations for all models utilized, and possibly over multiple rate setting subsystems.

In addition to the six models that were just described, Figure D-1 shows four other sets of elements, namely:

g. Exogenous Factors
h. Scenario Structures
i. Technological Factors
j. PRS Objectives

g. Exogenous Factors include consumer price indices and other socio-economic parameters, health care policies and regulatory policies. These are basically input data and ground rules influencing some of the variables in the six models.

h. Scenario Structures, as defined in Chapters 3 and 4, serve to reduce the extreme multiplicity of cases that could conceivably be examined, and thus define a manageable requirement for analyses.

i. Technological Factors express the state of data processing technology for each major processing function in terms of performance per dollar, in accordance with the discussion in Chapter 2 and Appendix A.

j. PRS Objectives will be defined in terms of an objective function or set of functions, describing the nature of the desired results. For some purposes at least, such a function could deal with financial variables only, as illustrated in the next section.

In specific studies, the model variables can be manipulated to maximize the objective function, or it can be preset, and the requirements for meeting it determined.

D-2 Notes on the Financial Variables

Although the financial details of the set of models just described may be quite elaborate, the overall financial structure should be relativel straightforward. The basic equation for the objective function is simply:

$$\begin{matrix}\text{Net cost}\\ \text{savings}\end{matrix} = \begin{pmatrix}\text{Realizable}\\ \text{savings in}\\ \text{payments}\end{pmatrix} - \begin{pmatrix}\text{Rate setting}\\ \text{cost}\end{pmatrix} - \begin{pmatrix}\text{Additional costs}\\ \text{to providers}\\ \text{and purchasers}\end{pmatrix} + \begin{matrix}\text{Savings from having}\\ \text{integrated functions}\end{matrix}$$

where each component is expressed in \$/year.

The realizable savings are aggregated over all providers in the rate setting area, and can be viewed (as can the net cost savings) conceptually as a:

- multiple of $\left\{\begin{pmatrix}\text{Rate Setting}\\ \text{Cost}\end{pmatrix} + \begin{pmatrix}\text{Additional costs}\\ \text{to provider}\\ \text{and purchasers}\end{pmatrix} - \begin{pmatrix}\text{Savings from}\\ \text{having in-}\\ \text{tegrated}\\ \text{functions}\end{pmatrix}\right.$

or

- fraction of the product $\begin{pmatrix}\text{Previous}\\ \text{year's}\\ \text{payments}\end{pmatrix} \bullet \begin{pmatrix}\text{Inflation rate}\\ \text{in general}\\ \text{economy}\end{pmatrix}$

or

- fraction of $\left\{\begin{pmatrix}\text{Previous}\\ \text{year's}\\ \text{payments}\end{pmatrix} \bullet \begin{pmatrix}1 + \begin{matrix}\text{Inflation}\\ \text{rate}\end{matrix}\end{pmatrix} - \begin{pmatrix}\text{Normatively}\\ \text{determined}\\ \text{projected}\\ \text{payments}\end{pmatrix}\right\}$

The cost of rate setting is the sum of the costs associated with each type of PRS activity such as screening of rate submissions. To estimate these cost components requires a detailed picture of PRS activities over an annual cycle and quantitative characterization of the PRS "life cycle." The latter would begin with system design and implementation, followed by pilot operation and then full PRS operation. If the initial period of full PRS operation were highly successful in removing the "fat" from the health care system, PRS might then enter a maintenance phase except for extraordinary changes in the health care environment or medical technology. Other costs and savings in payments would also go through life cycles.

In a given year, it is possible for any terms in the basic equation except the rate setting cost to be negative. For example, the third term on the right could be negative if provider accounting and reporting costs decreased from one year to the next due to introduction of new or modified rate submittal requirements (or perhaps savings from more effective utilization of the PRSIS by the providers and purchasers). The other two terms would be negative if, for example, rate setting analysis showed that on average provider costs were actually lower than they should be, in the sense that additional capital expenditures and services or increased staffing were necessary; introduction of new major national health programs, with sharp increases in demand for certain services could conceivably introduce this sort of situation.

The more typical situation is for the net cost savings and realizable payment savings both to be positive each year. The latter could start out relatively large during the first few years of rate setting, then may decrease to a smaller value as the maintenance phase sets in. The rate setting cost may also decrease with time if the function goes into a maintenance phase.

One type of analysis, using a present value for net cost savings, the basic equation and portions of the models described earlier, could be carried out as follows:

1. Define a net cost savings target, for example, in terms of the previous year's payment or rates or actuals, inflation rates, the availability of funds, normative standards, and trends. Based on similar data, estimate anticipated payments for the budget year that would be made in the absence of PRS.
2. Translate (for example based on historic data and distributions by cost level for each provider group) the method and associated parameters of screening, review and other components of PRS into a) expected total annual payments, b) an annual cost of rate setting, and c) costs to providers and purchasers.
3. Select parameters in step 2, such as the tightness (percentile cut-offs) of cost and productivity screens, so that the right hand side of the equation at least equals the target net cost savings.

Step 2 is the most difficult; it includes use of the models of the PRS itself and of the PRSIS, and of parts of the provider and bulk purchaser models.

GLOSSARY

Baseline or Illustrative Configuration

The set of choices from among technical alternatives that will implement a subsystem or system option will be referred to as a baseline configuration. It is a conceptual subsystem or system design based on explicitly defined criteria.

National Viewpoint

This viewpoint encompasses the nationwide rate setting functions and their related information system. The scope of these functions includes not only the direct activities of all the individual RSAs, but also inter-RSA activities, as well as coordinating and integrating activities at the national level. Consequently, this viewpoint considers the individual RSAs -- their functions and information subsystems -- as either building blocks from which the national system can be assembled, or partitions into which that system can be divided.

Options

The subsystem or system options are the choices open to the information (sub) system designer. Options are subsystem or system wide.

Rate Setting Agency (RSA) Viewpoint

In this viewpoint, only the functions carried out by an individual rate setting authority are considered, together with the information support that these functions require.

Scenarios

The environment in which the PRSIS will operate is uncertain at this time. Major uncertainties involve whether and what form of National Health Insurance might be enacted, what type of PRS legislation might

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be enacted, ar der procedures
might exist. sibilities that
might conceiva ossibilities were
to be examine ed using judgement
and covering lated environment
is designated

Technical Alt

Technical alt dling functions
(e.g., data s

Topology

The subsystem (locations where
data handling hes (channels or
paths for tra d to as the sub-
system or sys

Variables

There are three classes of variables used to define RSA viewpoint and national viewpoint scenarios -- those pertaining to the health care environment, those pertaining to PRS, and those pertaining to the PRSIS system or the RSA subsystem of the PRSIS. Some are used to construct scenarios; others are left free.

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